

DOMESTIC ANIMALS
OF MESOPOTAMIA
PART I

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General Editors

J.N. Postgate
Faculty of Oriental Studies
University of Cambridge
Sidgwick Avenue
Cambridge CB3 9DA
U.K.

M.A. Powell
Department of History
Northern Illinois University
De Kalb
Illinois 60115
U.S.A.

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PREFACE

This volume of the *Bulletin on Sumerian Agriculture* is devoted to papers presented to the meeting of the Sumerian Agriculture Group on sheep and goats, hosted by the Institut d'Estudis Orientals of the University of Barcelona in July 1990. On behalf of the participants in the meeting the Editors of the Bulletin are glad to take this opportunity of thanking the Institute with all its staff, in particular Prof. Dr. Gregorio del Olmo Lete, for their most generous hospitality which helped conspicuously to make the meeting a success. The initial proposal to meet in Barcelona came from Miguel Civil, whose presence at the meeting also enlivened the proceedings.

* * *

Despite the title of the volume, readers will notice that on this occasion we cast our geographical net much wider than before. This was partly in view of the nature of the subject, partly in response to the expertise of our hosts at Barcelona in the Ugaritic sources, and partly because we were conscious of the intensive work on the subject which has been carried on by our Aegean colleagues in recent years.

We do not have space in a single volume of the *Bulletin* to include all the material from Barcelona. Contributions from J. García Recio, R.H. Meadow, J.N. Postgate, M.A. Powell, and P. Steinkeller will begin the next volume, Domestic animals of Mesopotamia Part II (*Bulletin on Sumerian Agriculture*, Vol. 8), the second half of which will take some (though probably not all) of the papers from our next meeting (Leiden, July 1993), which is devoted to cattle (Grossvieh) and pigs.

* * *

As in previous volumes, bold type is used for Sumerian, italics for Akkadian words. Neo-Babylonian logograms are left in capitals. Bibliographical conventions generally follow the usages of the individual authors, but Harvard system references are used for books and articles, whereas traditional Assyriological abbreviations are preferred for text editions. These can be tracked down in one of the following works: R. Borger, *Handbuch der Keilschriftliteratur*, W. von Soden, *Akkadisches Handwörterbuch*, the Chicago *Assyrian Dictionary*. For Ur III references the catalogue of Sigrist and Gomi can now be used (see p. 160).

* * *

Once again, the format and typography of this volume have benefited from the support of the Literary and Linguistic Computing Centre in Cambridge: our thanks are due equally to Beatrix Bown, John Dawson and Rosemary Rodd for their help and readiness to solve our problems. Thanks go also to Dr. Sabah Abboud Jasim for advice on modern Arabic transcriptions, and to Jonathan Blanchard Smith for much assistance with the type-setting and to Trinity College, Cambridge, for its financial and other material support.

Nicholas Postgate
Marvin Powell

June 1993

Addresses of contributors

Simon J.M. Davis	Ancient Monuments Laboratory, English Heritage, 23 Savile Row, London W1X 1AB, U.K.
G. van Driel	Department of Assyriology, University of Leiden, POB 9515, 2300 RA Leiden, The Netherlands
Dr. P. Halstead	Department of Archaeology and Prehistory, University of Sheffield, Sheffield S10 2TN, U.K.
Prof. W. Heimpel	Department of Near and Middle East, University of California, Berkeley, Ca. 94703, U.S.A.
Dr. J.T. Killen	Jesus College, Cambridge CB5 8BL, U.K.
Prof. E.L. Ochsenschlager	Department of Anthropology, Brooklyn College, Brooklyn, NY 11210, U.S.A.
Prof. Dr. G. del Olmo Lete	Facultad de Filologia, Universidad de Barcelona, 08007 Barcelona, Spain
Dr. R.W. Redding	Museum of Anthropology, University of Michigan, Ann Arbor, Michigan 48109, U.S.A.
Dr. M.L. Ryder	4 Osprey Close, Lord's Wood, Southampton SQ1 8EX, U.K.
Prof. J. Sanmartín	Departament de Filologia Semítica, Universitat de Barcelona, Gran Via de les Corts Catalanes 585, 08007 Barcelona, Spain
Prof. M. Stol	Heivlinder 27, 2317 JS Leiden, The Netherlands
Prof. M. Van De Mierop	Department of Middle East Languages and Cultures, 605 Kent Hall, Columbia University, New York, NY 10027, U.S.A.

THE ZOO-ARCHAEOLOGY OF SHEEP AND GOAT IN MESOPOTAMIA

Simon J.M. Davis

(Ancient Monuments Laboratory, English Heritage, London)

The purpose of this note is to try to answer two questions by briefly summarising available zoo-archaeological data from Near Eastern sites. The questions are first, when were caprines (sheep and goats) first domesticated, and second following their domestication, when were their so-called secondary products (milk and wool) first exploited?

In order to answer the first question, data from a wide geographical area (the whole Near East and Greece) are considered. To answer the second question, data from a more restricted area (Mesopotamia and the circum-Mesopotamian region in the 8th to 1st millennia BC) are considered. An answer to the former is now reasonably well-attested, but an answer to the latter is somewhat hypothetical due to the tenuous nature of the data (e.g. small samples).

1 When were caprines first domesticated?

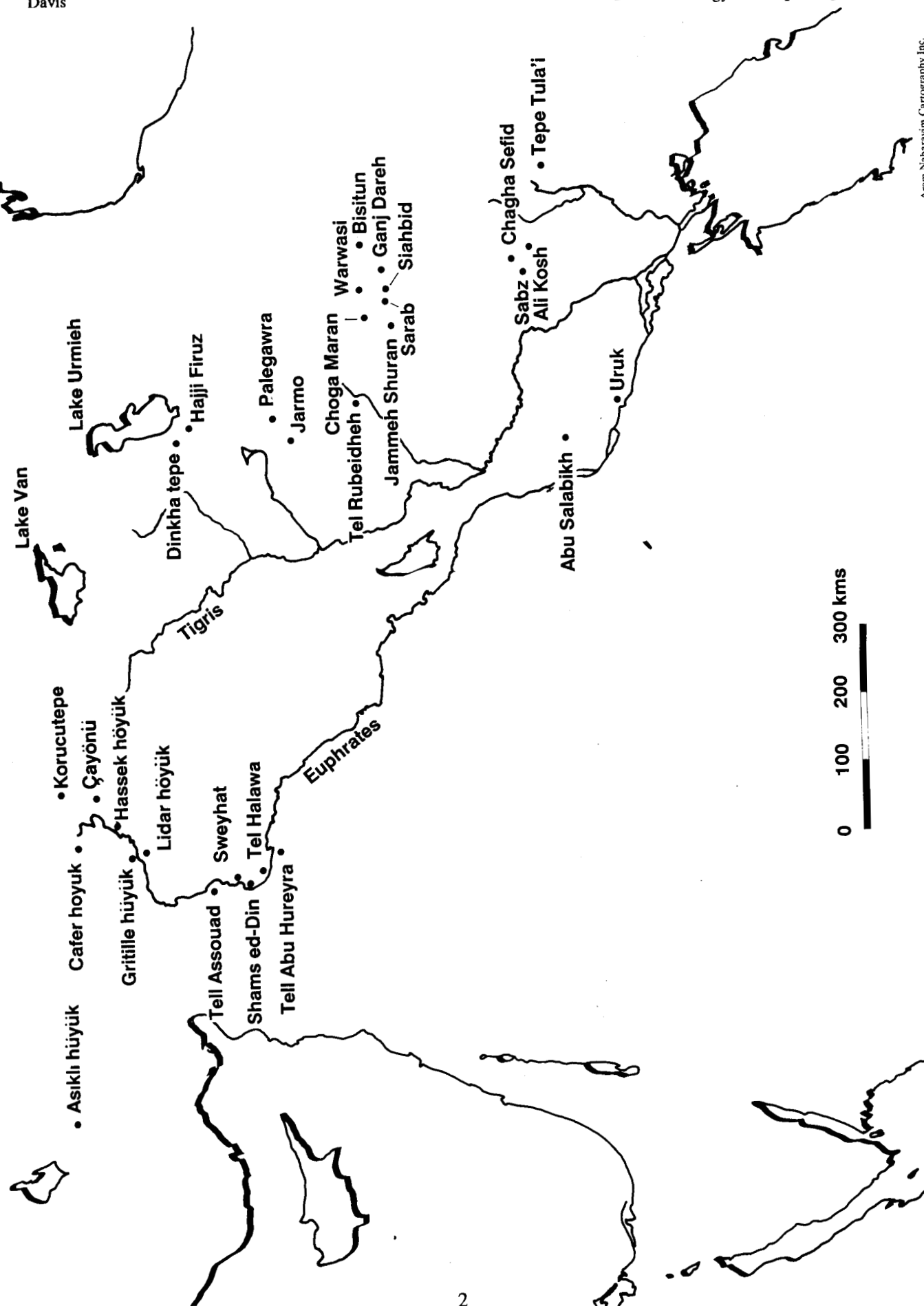
Some general observations and a suggested date for the beginning of sheep and goat husbandry in the Near East are offered. Certain aspects of the Near Eastern zoo-archaeological record such as a shift in the spectrum of species, the introduction of exotic species, and variation of size indicate when the change from hunting to herding began:

- Species spectrum shift.** Successions of faunal assemblages (e.g. in the Kermanshah region and at Abu Hureyra, but also in the southern Levant and Greece) show that a change occurred in the 8th/7th millennia bc from species not thought to have been domesticated such as cervids, onager and gazelle, to sheep and goats (Payne, 1975; Clutton-Brock, 1978; Davis, 1982; Legge and Rowley-Conwy, 1987). (Note: some hunting continued, especially in the Neolithic).
- Size.** Sheep became smaller in the 8th millennium bc (Uerpmann, 1979).
- Introduction.** In the 7th millennium bc, sheep were introduced into regions such as Greece and Cyprus where none had occurred previously (Payne, 1975; Davis, 1991).

Conclusion: *sheep and goats were probably domesticated in the Near East during the 8th or 7th millennium bc.*

2 Following sheep and goat domestication, when were their secondary products first exploited?

A survey of the zoo-archaeological data summarised in Table 1 (see also Fig. 1) suggests several trends in man-animal relations in Mesopotamia during the last 10 millennia. These trends can be broadly itemised under three headings from which hypotheses (in italics) can be erected as follows:



Observation

Hypothesis

a. Wild mammal nos.

The proportion of wild mammals declined.

Hunting decreased in importance after the Neolithic.

b. Goat:Sheep ratio

In some areas (e.g. the Kermanshah region and Khuzistan) sheep became more abundant. This may have occurred in the 5th millennium bc.

Wool became important in the ?5th millennium bc.

c. Goat/Sheep age distribution.

In the Neolithic most goats and sheep were culled when young. Perhaps by the 5th millennium many of the sheep (and possibly goats too) were not slaughtered until several years old.

Neolithic sheep and goats were kept primarily for meat/hides. The exploitation of sheep and goat secondary products (wool, hair, milk, dung, etc.) began perhaps in the 5th millennium.

Summary

In the Near East sheep and goat were probably first domesticated in the 7th or 8th millennium bc. This intensification of man's relationship with animals was perhaps necessitated by an ever increasing scarcity of resources brought on in part or whole by demographic pressure (Davis, 1991). During the first two-three millennia of caprine husbandry, sheep and goats were, it seems, mainly reared for their meat and skins. The earliest evidence for milk and wool exploitation comes from the 5th millennium BC (see also Sherratt, 1983). This shift in emphasis from primary or slaughter products to secondary products represents a second increase in the intensification of man's relation with animals and may also have been necessitated by demographic pressure.

Acknowledgement: I am grateful to Sebastian Payne for help in finding several of the references mentioned herein.

An attempt to summarize certain quantitative data taken from published reports of faunal remains from sites in the Mesopotamian and circum-Mesopotamian region.

For each site the following are listed:

Date bc/BC: The distinction between radiocarbon years and calendar years is often unclear in the literature. Such cases are written “BC”, otherwise bc = radiocarbon years and BC = calibrated dates or historic dates.

Region: Arranged rather crudely from top (north) to bottom (south).

Site name or Phase: The author's spelling is used. The data from Hole et al. 1969 are pooled into 'phases' (= ph). For some multiperiod sites data are presented from levels with abundant faunal remains only.

Wild mammal nos.: Indicates approximately what proportion of the faunal assemblage comprised wild, i.e. hunted mammals (usually = deer, gazelle, onagers, wild sheep, wild goats).

Goat:Sheep ratio: The proportion of domestic goats to domestic sheep in the faunal assemblage. These estimates are very approximate and should be treated with great caution. Most goat and sheep bones are difficult to identify to species.

Goat/Sheep age distribution: Very approximate estimates of the ages at which goats and sheep were slaughtered are given. Different methods of estimating age-at-death have been used and some publications fail to define rigorously the ageing criteria used. Difficulties of goat-sheep distinction mean that the two species are usually treated together as a single flock of 'sheep/goat'. This is a pity in view of the different economic uses of sheep and goat (see Payne, 1973).

[illegible]

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SHEEP AND GOAT HUSBANDRY

WITH PARTICULAR REFERENCE TO TEXTILE FIBRE

AND MILK PRODUCTION

M.L. Ryder

(Southampton)

1 Introduction

In this paper I consider the evidence for milk, hair and wool production in Sumer. The subject has two themes: (a) the kind of animals kept, which is my main interest, and (b) the systems of husbandry. First, I review the domestication and history of goats and sheep to indicate the position of Sumer in the overall pattern. From Sumer we have mainly written records and illustrations of animals. Other areas have more bone and textile remains and even surviving breeds. This section will also include some of the basics and terminology of hair and wool biology. My treatment is based on Ryder 1982;1983a and 1991a and so I will only give key and more recent references.

2 Domestication and the development of a fleece

Goats and sheep were first domesticated in the foothills of the Zagros mountains where modern Turkey borders on Iraq and Iran. The village site of Zawi Chemi Shanidar in the Kurdistan area of northern Iraq had bone remains said to date from about 9000 BC, and the relatively high proportion of bones from immature animals (25% goats and 43% sheep) suggested domestication. Davis (this volume) puts the date of domestication about 7000 BC. The relative proportions of sheep and goats varied at different levels, averaging 50% sheep and 42% goats. From then until now, throughout the Middle East, the two species have been grazed together in mixed flocks. Some of the Sumerian flock records, however, suggest separate flocks of sheep and goats.

Another village with early bone remains is Tepe Sarab on the Kermanshah plateau in Persian Kurdistan. This site later had many clay figurines of livestock, including sheep (see below). In south-western Iran seasonal pastoral camps as well as permanent farming villages suggested that seasonal transhumance of livestock had already begun. True nomadism may have been a later development. At Tepe Sabz and Ali Kosh between 7500 and 6500 BC there were fewer sheep than goat remains. Except for one hornless sheep skull, the skeletal remains were indistinguishable from those of wild animals. The age and sex structure of the population was different from that in the wild since a high proportion of young males had been killed. From 6000 BC onwards sheep became more common, and after 4500 BC sheep predominated and there was a decline in skin-working tools with an increase in the number of spindle whorls. This suggests a change from skinwear to clothing made out of spun and woven sheep's wool. This sequence has also been reviewed by Redding (this vol.).

Once animals had been domesticated they became more valuable alive than dead (forming capital as indicated by Halstead, this volume), and the wish to avoid slaughter could have stimulated a search for alternatives to meat as food in the form of blood and milk. The resulting shortage of skins could have provided a similar stimulus to seek alternatives to skins for clothing in the form of wool. The new products that became available (Fig. 1) have come to be referred to

as "secondary Neolithic products" by archaeologists e.g. Greenfield (1988). Davis (this vol.) gives 5000 BC as the date when bone remains from older animals began to predominate, suggesting the exploitation of the secondary products milk and wool. Felt was almost certainly the first fabric made from animal fibres. Although felt-making must be very old, and there have been hints of felt remains from sites as far back as the Neolithic site of Çatal Hüyük in Turkey, the earliest actual and undisputed remains of felt date no earlier than the frozen burials at Pazyryk in Siberia dated about 500 BC. Steinkeller (1980) refers to records of felt in Mesopotamia dated 2500 BC.

Felt-making may have been inspired by the observation of the natural felting of the underwool of Neolithic sheep and I have seen this happen in Mouflon sheep during the spring moult. Felt could therefore have been made from the underwool of sheep or goats before a fleece had been developed. Sometimes instead of forming felt, the rubbing of the animals twists the shedding wool into long strands, and this could have led to the Neolithic invention of spinning.

Sheep and goats spread over a large part of the Old World during the Neolithic period. The goat at first would have been more useful in forest clearance, after which the sheep emerged as the economically superior animal because of its wool. Both species have mutations in horn shape and ear length, but in goats the tail has remained short and thin. Why sheep have varied more than goats, particularly in the development of a fleece, is an interesting biological question. From the generally brown colour of the wild animals each domesticate has developed a range of additional colours - black, white, grey, tan and spotted, some of which are evident in the wall paintings of ancient Egypt. The sheep are shown with a smooth hair coat, which was the appearance before a fleece had developed. The main change in the coat of goats has been a lengthening, so that primitive breeds have longer hair than either the wild ancestor or modern breeds.

Each wild ancestor has a double coat in which coarse bristly kemp-hairs of the outer coat obscure very fine underwool (Fig. 2). The structure of the coat of most domestic goats is little, if any, different from that of the wild ancestor, and goat hair (which has coarser hairs than those of hairy sheep) is used entire with no separation of the underwool. The statement of Morrison (1981) that sheep were plucked, but goats shorn implies the use of goat hair in this form. Cashmere, which developed in highland Asia is the underwool combed from a coat of this type during the spring moult. The only goat to develop a fleece is the Angora breed, which emerged in post-medieval Turkey; in this the underwool has become longer and coarser and constitutes mohair (Ryder 1986).

The coat of the first domestic sheep of the Neolithic period must have been similar to that of the wild ancestor (Ryder 1987). Evidence on the time it took for a fleece to develop comes from the Mouflon sheep of Corsica and Sardinia. These are now thought to be not truly wild animals, but feral descendants of domestic sheep introduced by Neolithic settlers about 5500 BC. The primitive features of the Mouflon are: 1. It is coloured; 2. It has a hair coat like that of deer; 3. The coat is moulted annually in the spring; 4. It has large horns and a short tail. Since the Corsican Mouflon has a coat that is apparently no different from that of other wild sheep, such as the Bighorn of North America, which was never domesticated, it appears that no change took place during the 3000 or so years that elapsed between domestication and their introduction to these islands. The Cypriot Mouflon must also be a feral domesticate.

The first main change in the development of a fleece was a narrowing of the outer coat kemp hairs, and it could be that selective breeding for a softer (and therefore finer) coat began while skins were still being worn as clothing. The result was the Hairy-medium type of fleece which is

found in Danish Bronze Age textiles and in the surviving hairy Soay sheep of St. Kilda (Fig. 3). Further narrowing of the outer coat hairs changed them into medium fibres, which merged with the finer undercoat to form the Generalised-medium fleece. This provides an evolutionary link between the primitive hairy types to the top and left of Figure 3 and the more highly developed modern fleeces to the right. These developed in the Iron Age and Roman period.

The Generalised-medium type, too, had developed by the Bronze Age and is found in the woolly variety of the surviving Soay sheep. The woolly type is plucked to harvest the fleece, but the hairy type can be combed if one wishes to obtain the underwool rather than the outer hair. Some Danish Bronze Age wool has only fine fibres, which suggests not only combing, but a fleece intermediate between the Neolithic coat and the Hairy-medium type (Ryder 1988). In fleeces, the wool fibres hang together in locks known as staples. In hairy fleeces the staples are shaped like a pyramid. The tip of hairy staples is formed by the long, coarse hairs, and the base is filled out by the more numerous, shorter and finer wool fibres. A crude clay figurine of a sheep dated 5000 BC from Sarab in Iran shows what might be the first hint of a fleece (Fig. 4). With the Egyptian sheep a hair coat is shown smooth, whereas here there is a series of Vs that could represent the staples of a Hairy-medium fleece.

3 The types of animals from illustrations.

In the earliest type of sheep illustrated from Sumer only the rams had horns and these had a corkscrew spiral (Ryder 1983a & 1984). The sheep lacked a fleece and in the first archaeological accounts were described as "hairy" since the coat was shown smooth, or by straight streaks as opposed to the wavy lines used to indicate the wool of a fleece. Such a coat is like that of Neolithic sheep, which is virtually identical to that of the wild ancestor. It persists today in tropical sheep, which agriculturalists call "hair" sheep. Both names are misleading since the term "hairy" is used by wool biologists (Fig. 3) for a particular type of fleece, and the "hairs" of "hair" sheep are in fact kemps. "Non-fleeced" is in fact a better term for such a coat.

The spiral horns are a product of domestication, and have been confirmed by skeletal remains. A tail of medium length, and pendant ears in some of these sheep indicates appreciable change since domestication, but the throat fringe of the rams is a primitive feature (Fig. 5). Even wild animals can possess primitive as well as more highly evolved features. Another type or breed depicted in the earlier periods was a woolled (fleeced) animal with a short, thin tail and either erect or pendant ears. The rams have coiled horns, which are of the usual shape found in modern sheep. This type is often shown being milked (Fig. 6). The depiction of wool staples confirms the existence of a fleece, but the type of fleece is not clear. It is not clear to what extent this wool was used in clothing since the earliest illustrations of dress (such as those on the Standard of Ur) show what are regarded as sheepskin kilts, which appear to have wool staples. Whereas hairy staples have a pointed tip and are described as "tippy", finer wools have staples with a straight end and are termed "blocky". It is mainly with the reliefs of Greece and Rome that such differences become clear.

A third type of sheep depicted had a fat tail. There was no fleece, but the horns, in the ram only, were of the "normal" shape seen in the fleeced sheep (see above). A fat tail evolved in an arid area to store food and this could well have occurred in the deserts adjacent to Mesopotamia. The initial development almost certainly took place in a short-tailed sheep since this stage persists today as the fat-rumped type and it usually lacks a fleece. Appreciable development is indicated by the medium length and broad nature of the tail in the first illustrations of Uruk III of about

3000 BC. Hilzheimer (1936) thought that the smooth coat of the fat-tailed sheep on the Standard of Ur indicated the animal after wool harvesting. Some fat-tailed sheep certainly developed a fleece and such sheep are the main type depicted in Babylonian times from about 1800 BC and Assyrian times from about 1300 BC. The bronze gates of Shalmaneser III (ninth century BC) in the British Museum bear reliefs of two kinds of sheep both with Ammon (normal) horns. One has a fat tail and the other a thin tail, each with a curl at the end, and one wonders whether these illustrate the seasonal change in the tail of the same kind of sheep.

In some sheep there was a gradual lengthening of the tail and Herodotus was the first to note the modern distinction between the short, broad tail like that of the Mesopotamian illustrations, and the long fat tail, which often has an S shape. One must also be aware that a broad tail can be produced by crossing a fat-rumped sheep with a long, fat-tailed type.

The La Haye cylinder seal shows corkscrew-horned goats being milked c. 2400 BC (Fig. 6). The beard of the animal at bottom left confirms that it is a goat. There are sheep with normal horns at the bottom right. The coat of these animals is not very informative; the sheep are shown hairy like the goats. We see this also on the Peace Panel on the Standard of Ur, which in addition to having a broad-tailed sheep with normal horns, but no fleece, has two sheep with the same kind of head, but with a short thin tail and a fleece. With them is an animal with corkscrew horns, which is identified as a goat by its beard and erect tail. Its coat is depicted by the same wavy lines and pointed staple tips as the fleeces of the sheep next to it, which appears to be of the true Hairy type, but I think that this type developed later (Fig. 3) and so this could be Hairy-medium.

Hilzheimer (1936) thought that the three above kinds of sheep could be recognised in Sumer, viz: a corkscrew horned type with no fleece (Fig. 5), a type with normal horns and a fleece (Fig. 7), and thirdly a type with normal horns and a fat tail, but with no fleece (Fig. 8), although he did agree that the fat-tailed type later developed a fleece. Zeuner (1963) on the other hand claimed that by 2000 BC there were five types, the extra ones being a screw-horned fleeced type and one like this but with straighter horns. He omits the non-fleeced fat tail at this date. He believed that there was a tendency for the ears and tail to become longer, and for the ewes to become hornless, but the different characters were independent. The screw-horned "hair" type had retained the wild coat, but had a longer tail and a different horn shape. The normal-horned wool sheep, on the other hand, had retained the horns and tail of the wild type, but had developed a fleece. Minor variations could well stem from the artist rather than from actual differences, although major difference, such as the presence or absence of horns are likely to be real.

Zeuner thought that there must have been more than five "breeds" since the 31 variants of the ideogram for sheep were more than required to indicate age and sex differences. That provides an interesting linguistic problem, but if one allows three sex variants and seven age groups, that would only allow ten breeds. This compares with eight to ten breeds listed by Steinkeller (BSA 8): native, improved, three fat-tails (including long and short) and three foreign breeds.

The wall reliefs from the palace of Tiglath-Pileser (eighth century BC) show horned and polled fat-tailed sheep in which the wool staples are shown as horizontal ellipses. These appear to indicate the "blocky" staples of fine-woolled sheep as opposed to the "tippy" staples of less-fine fleeces. Also in the British Museum is a c. 700 BC relief from Nineveh showing Assyrians receiving booty with two sheep having normal horns in which the fleece is shown by a diagonal criss-cross pattern.

By 500 BC Assyria was giving sheep tribute to Persia and a relief from Persepolis shows rams with a fat tail with a twist at the base, i.e. the modern S-shape variant already mentioned. The fleece of these is shown in amazing detail. Wool fibres are shown within the overlapping, pointed staples, which point correctly in a posterior-ventral direction. Also shown is a curl at the tip of each staple: this derives from the lamb coat and so indicates that these are first fleeces and that in turn the animals are unshorn yearlings.

Going back to 860 BC, there is an Assyrian relief of Sennacherib showing soldiers crossing a river on inflated sheepskins. Sheepskins and goatskins were removed as a tube to preserve the shape of the animal and the resulting bag provided a universal container for liquids as well as solids. Mesopotamia also had skin boats, and shepherds depicted on cylinder seals carried a whip with a long lash and a plaited handle, which appears to be leather, but could be raw-hide. Writing on skin in the form of parchment is depicted on Assyrian reliefs from about 800 BC. This was associated with the introduction of the Aramaic script, which was not suitable for use on clay (Ryder 1991b).

4 Records

Records begin about 2500 BC and the distinction between *bibbu* (wild sheep) and *immeru* (domestic sheep) suggests that wild sheep survived in the area. Indeed Steinkeller (BSA 8) refers to the crossing of domestic sheep with wild rams. This is likely to have been advantageous only as regards "vigour" since such crossing would dilute what had been gained through domestication, and he shows that the crossbreds were lower in value than pure domestic sheep.

Clay tablets from the third dynasty of Ur dated about 2100 BC distinguished wool sheep from meat sheep, so the latter could have had a "hair" coat, although Ur III and Neo-Babylonian documents suggest that the sheep for meat were merely drawn from the flock and were not a distinct breed (see Heimpel and van Driel, this vol.). Wool sheep were also recorded at Uruk by Green (1980). The appearance of white sheep, not evident in the reliefs, is confirmed by records of black and white sheep although there is an indication that the commonest colour was brown, e.g. Abusch (1981) who also records a flock in which eight of 39 sheep were red, i.e. the red of red deer, which is the brown colour of primitive sheep. Heimpel (this vol.) gives one record with 78% black. Steinkeller (BSA 8) records the full range of sheep colours (first seen in Europe in the Iron Age, Ryder 1990a): brown, black (which could include grey, Heimpel, this vol.), spotted (coloured with white markings), white, and yellow (since this is not discolouration [Heimpel and Steinkeller, in discussion] it could be "tan"). Brown and black are eumelanin and tan is phaeomelanin, found in genetically white sheep (Ryder 1990b).

Sheep under royal patronage at Ur were white and highly valued because they were uncommon. The sheep of Amurru and Ur seem to have been particularly valued, which implies breed variation. At least two early kings had an interest in wool, which was weighed in the temple. The three broad wool grades: first, second quality and mountain, appear to foreshadow the three broad modern divisions - fine (Merino), semi-fine (crossbred) and carpet wool. The second quality was downgraded because it was yellow, which was a fault, as today (see possible origins of the Golden Fleece legend (Ryder 1991c)). If, however, the yellow is tan pigment, then the fault is genetic, i.e. the wool is not pure white. According to Steinkeller "mountain sheep" means wild sheep (above) and "mountain wool" means wool from a foreign breed.

There were wool-grading sub-divisions which are indicated in the same third dynasty tablets from Ur. The best was the "property of the Moon God" (the god of shepherds); then came

“royal”, followed by mixed, fine sheep neck, black wool, dead wool and wool “combed from third”. I merely list these grades/sorts in Ryder (1983a) but they provide an interesting topic for study. A distinction must be made between “grades”, which refer to the entire fleece and “sorts”, which derive from the splitting of the fleece into the different qualities it contains. “Fine sheep neck” implies wool sorting, which is usually done immediately before textile manufacture, and sorting is implicit in descriptions given by Heimpel (this vol.).

I will discuss only “dead wool”, which is a term that causes confusion today since wool-graders use it to refer to kemp-hair, which they believe to be dead, whereas all wool and hair is dead above the skin surface. Could this refer to wool from sheep that had died a natural death, which is referred to as “fallen wool” today? The term “skin wool” is used for wool obtained from the skins of slaughtered sheep. Steinkeller (BSA 8) lists a term for wool removed from a dead sheep with a knife. He gives no terms for differences in quality - each wool is named according to the breed of origin. The “damaged fleece” referred to by Powell (BSA 8) could refer to wool made tender during growth by stress due to poor diet or disease. The Ur tablets also record the details of the collection of wool, its price and the taxes to be paid on it. How it was removed from the sheep will be discussed in the section on husbandry (below).

The Code of Hammurabi (c.1800 BC) lists wool as one of the three main products of Babylon along with corn and oil, and Babylonia has been referred to as the “Land of Wool”. Wool was (rightly) regarded as a type of hair, and goat hair, too, was woven. The reference to Sumerian rulers as “Good Shepherds” suggests that they had once been a pastoral people, but they were now mixed farmers and sheep and goats were kept by nomads in the surrounding areas, from which animal products were obtained in exchange for grain and other objects. Sheep and goats were the most numerous and important farm animals. One possible explanation of the traditional literary designation of humankind as “black-headed” could be that this belongs with the metaphor of the ruler as shepherd and means sheep, since breeds with this colour pattern exist today.

5 Husbandry

Clay tablets from Ur dating about 2100 BC record flocks of sheep numbering from 2000 to 27 000 head. This must indicate ownership rather than flock size, since it is not easy even today for one man to shepherd a flock much larger than 300 animals. In Gilgamesh there is also a reference to slaughter for meat as well as sacrificial slaughter, the meat from which was used to feed the temple workers, and the internal organs for divination. “Shepherd” was probably a distinct occupation and sheepfolds are mentioned. These were probably built of reed wickerwork as were houses, which persist today as the *Zorife* shelter. Flocks were moved in a transhumance from winter to summer pastures, a custom confirmed by the Nuzi documents studied by Morrison (1981). Hammurabi has penalties against shepherds who pastured animals in a field without consent. There are records of disputes between agriculturalists and pastoralists, which foreshadow that between Cain and Abel, and which are still with us.

Wool seems to have been harvested by plucking, the usual method with moulting sheep until recent times. The Nuzi documents by Morrison (1981) confirm that sheep were plucked, plucking being carried out in special compounds outside the temple precincts of Sumerian cities. Selective breeding for continuous wool growth is unlikely to have begun until shears to remove the fleece had been developed in the Iron Age. Although Morrison states that goats were shorn, she does not indicate whether a knife or shears were used (see below). For the philological evidence,

Postgate refers to the Chicago *Assyrian Dictionary* B, 97–9 s.v. *baqāmu*, and G, 59–60 s.vv. *gazāzu* and *gazzu*.

Melena (1987) thought that combs had been used to harvest wool before the development of shears because the Sumerian ideogram for “shear” is a comb. Combing implies the selective removal of the shorter and finer underwool from the longer and coarser hairy fibres of a primitive fleece, and this is the way that cashmere is harvested from goats in China (Li Jian-Ping 1988), where hairy sheep, too, are combed to obtain the underwool. Combing could have been one use for the bone, “weaving combs” from prehistoric Europe. Melena gave evidence that the Sumerian comb was made of wood, as with cashmere goat combs in Iran and Nepal, which are wooden rakes, although the traditional Chinese combs are iron. Melena also stated that the washing of sheep to remove dirt and grease from the wool before plucking is well attested in Old Babylonian texts, Heimpel (this vol.) also refers to washing before plucking. Washing before shearing was common recently in Europe, but is likely to cause wool loss with moulting sheep.

Fleece weight, too, comes from husbandry records, but it refers to the “breed”. Knowledge of the modern equivalent of Sumerian weights (Powell 1987–90) allows fleece weights to be estimated from the records. Few primitive sheep today grow more than 1 kg of wool and so estimates of 1.3 kg for Sumerian rams (meaning that ewes would grow 1 kg) are realistic. More recently Zaccagnini (1981) gave figures indicating a fleece weight of two minas of 504g or about 1 kg. Van De Mierop (p. 172 below) gives an average fleece weight of 0.83 kg and Powell suggests 0.68 kg from Pre-Sargonic texts. The average weight appears to lie between 0.5 and 1 kg.

Although moulting sheep can lose some wool before plucking, this is not the sole reason for low fleece weights. It is, however, the reason why there was a wish to breed for continuous growth and to shear sheep. You cannot pluck before the moult begins, but if plucking is left too late, wool is lost. It is not clear whether the reference to shearing by Forbes (1964) means shearing or plucking. The wool harvest took place in spring at the time of the New Year Festival; Morrison (1981) indicates from the Nuzi documents that this was the focal point of the annual husbandry cycle. Harvesting was carried out in a special house, the wool was stored in another building and sold in a third. The usual lot of wool handled by merchants was 600 kg, but a lot of over 3000 kg is recorded. Between 2000 and 1500 BC wool was worth four times as much as goat hair, a talent of 30.3 kg of wool ranged from 4 to 15 shekels of silver in price. Sale was governed by the code of Hammurabi.

Instead of a comb, a bronze knife could have been used to remove the fleece, although Melena (1987) found no evidence for the use of a knife in Sumer. A knife was used in north west Britain to cut off the fleece of sheep with continuous wool growth before the introduction of shears, and a knife is still used in Nepal. This may have led to the invention of iron shears, which are two knives working against each other. Shears originated in Anatolia about 1000 BC (Forbes 1964) and the first record is in a Neo-Babylonian text (see also van Driel, p. 240 below).

Considerable husbandry evidence comes from records at Alalakh in Syria, which was contemporary with Babylon. Villages around the city submitted details of livestock births by owner and species, e.g. 600 wool-bearing sheep, 37 goats. Flocks varied from 100 to 400 head in size, the larger ones belonging to semi-nomads. Several owners had at least three shepherds. There is reference to grass-fed sheep, and to lambs being born at harvest time and fed on “harvest grass”. Lambs are not immediately able to eat solid food, but does this refer to hay, straw or stubble? (Morrison (1981) indicated that grain was given as supplementary feed at Nuzi

to pregnant and lactating females as well as to fatten wethers). One ram was kept for every nine ewes, which is a low ratio of ewes, even by primitive standards. One ram to 50 ewes would be normal today. Wool was collected by plucking. One man plucked 308 sheep, and as many as 1557 sheep were plucked at one time. The fleece weight was 100 shekels, i.e. 0.73 kg. This is less than calculated for Sumer (above) but the same as contemporary Crete (Killen, this vol.); 12% of the wool was too poor for textile use.

Harra-hubullu (a Neo-Babylonian glossary of the sixth century BC) gives considerable information on sheep type and husbandry (Oppenheim & Hartman 1945). The big question is how far these details can be pushed back into earlier periods. This starts with male sheep and castration, and continues with barley-fed, grass-fed and fat sheep. Sheep were shorn with a *gir* (interpreted as shears), but some sheep were still plucked (presumably those that moulted). The distinction of Akkad sheep from Ur sheep suggests a breed difference, but "sheep of the fold" indicates a husbandry custom.

Sheep with a belt indicates fat-tailed sheep, the belt being used to support the heavy tail. Mountain sheep are listed as well as sheep for the gods, festivals and sacrifice. As well as sheep big with lamb, others that had miscarried, suckling lambs and milk-fed lambs, there are late lambs, summer lambs and winter lambs, which indicates a long breeding season (see below). There were terms for sick sheep and various diseases. Sheep of the stable suggests housing, but does "sheep of the second storey" or "of the roof" indicate sheep actually kept on the roof - sheep are kept on flat roofs around the Mediterranean, and they graze turf roofs in Scandinavia, today. As well as sheep with and without horns, black, white, brown, dappled (i.e. spotted) and yellow sheep are listed. It has emerged from this conference that yellow is not a discolouration, and so it is probably "tan" (see above). The grey of European Iron Age sheep is not mentioned. There was a word for carcass, and also dried mutton, cooked mutton and roast mutton.

At this point my re-interpretation of husbandry records will continue under specific headings:

5 (a) Flock size and herding contracts

Records of sheep numbers are useful in indicating flock size although they rather indicate ownership (Van Driel) and are not necessarily the total because of the few sheep owned by the shepherds (Heimpel). The chief feature of herding contracts is an inventory of the livestock put in the charge of the herder plus details of the conditions, which stipulate that any loss of animals through negligence should be made good, and also that payment will be made as a share of the produce, or sometimes in grain (Postgate and Payne 1975; Morrison 1981). Such a system, designed to make it in the interests of the herder to look after the animals well, has been used in later periods and in other parts of the world, including the proviso that the skin of any animals that had died should be kept.

With such strict conditions, it is not surprising that more than one herder was required to guard the livestock, and the relation of head shepherd to under shepherd, which I have seen today, notably in eastern Europe, is a more likely interpretation than the contractor to sub-contractor relationship proposed by Finkelstein (although the actual difference is no doubt academic). How the animals were marked to indicate ownership is not clear. Contenau (1954) stated that in Assyrian times sheep were marked with the owner's symbol, e.g. a star or a spade. The sixth century BC glossary (above) lists sheep marked with a dagger, but it is not sure whether the dagger is the instrument used or the shape of the mark. In recent times, where different flocks graze on common land, communities have developed elaborate systems of ear or

fleece marking to indicate the ownership of any straying sheep.

A pair of matching texts described by Abusch (1981) comprised a herding contract in which a tablet formed the owner's receipt and the shepherd's reminder was a sealed clay container with pabbles corresponding to the number of animals he had in his charge. The flock comprised 39 sheep and ten goats run together in a small and manageable flock.

Twenty herding contracts analysed by Postgate and Payne (1975) indicate flocks with four to 185 sheep and a mean number of 37. Only half of the flocks had any goats, the numbers ranging from one to 85, which made that flock the largest with a total of 270 sheep and goats, which approaches my optimum of 300 animals. Green (1981) compared these flock sizes with some from Uruk in the archaic period, which ranged up to 140 sheep (mean 68) and up to 50 goats (mean 26). Other flock sizes she lists for comparison are 200 to 500 for the Old Akkadian period, and 26 to 60 sheep at Ur III.

5 (b) Flock composition

Finkelstein (1968) records an Old Babylonian flock of 158 sheep and 64 goats. These were divided into 92 ewes, 20 rams, 24 lambs and 22 breeding lambs, which could be yearlings. The 64 goats listed comprised the more understandable 33 females (does), 27 kids and four males (bucks).

The flock of Abusch (1981) comprised 21 "ewes that lamb" (which I interpret as "breeding ewes"), eight rams, with six female and four male lambs. There were also six female goats and one male plus three female kids. It is not clear whether the rams were entire, i.e. kept for breeding, or castrated (wethers) kept for slaughter and/or wool production. The term "bearing" for the 11 ewes in the Nuzi documents which Morrison (1981) interprets as pregnant, I would interpret as (capable of) "breeding", although in this post-plucking spring census with autumn lambing they could be just pregnant again, and van Driel (in discussion) stated that some actually were. The four "once plucked" lambs are puzzling. Modern terminology defines lambs as being up to six months of age, and from then on until the yearling stage they are now termed "hoggs (hoggets)". Spring-born lambs cannot be plucked until they are a year old and one would expect autumn-born lambs to be 18 months old before they can be plucked for the first time (in spring). I doubt whether lambs born in autumn can be plucked at six months of age in their first spring, since moulting completes a rest stage begun in autumn.

This flock had no ram, but had a buck goat, which was probably used as a flock leader ("bell wether"). The Neo-Babylonian glossary lists "leading goat", which indicates their use to lead flocks. Morrison states that there was usually one goat to every two sheep, but the browsing goats are not kept to keep the sheep moving as she suggests, but to utilize all the vegetation.

In another flock of 99 sheep and goats listed by Morrison the sheep comprised 44% ewes, 42% wethers, 13% lambs and 1% rams. This indicates one ram to 25 ewes (cf. 50 ewes today). The lambs were replacements and so the percentage equals loss or slaughter and not the lambing rate. This further indicates a sheep life cycle of 6.5 years (which is good by modern standards) and 7 years for goats since their replacement figure was 12%.

Morrison gave the average flock size as 37 animals, comprising 25 sheep and 12 goats. Among the sheep 11 were ewes, 11 were wethers and three were lambs, whereas only one of the goats was a kid. By age the sheep could be divided into 43% adults and 57% lambs (which probably includes hoggs and yearlings) and by sex there were 52% females and 48% wethers.

From the average flock of 37 animals, six animals or 17% were lost during the grazing season. Since 90% of the losses were among adults, it appears that the main loss was from old age, which is what the annual replacements make good. Morrison compares this rate of loss with the 11% to 29% range in the Larsa texts in which lamb losses of 26 to 79% are quoted. Such high lamb losses were common until the recent development of veterinary medicine, and during a bad spring today in hill areas of Britain, losses of 30% of lambs during the first week or two of life are not uncommon.

5 (c) The question of products

One flock of Postgate and Payne (1975) comprising only young male sheep is interesting since I found in the Caucasus that the way of keeping ages and sexes separate was to put the animals into separate flocks. This supports my view that a high proportion of males does not necessarily indicate that wool was the sole product. It is more usual for all possible products to be used. Postgate and Payne considered that their overall ratio of 123 rams to the 339 ewes indicates the retention of rams for slaughter since the proportion was too low for wool production.

Green (1980) regarded the keeping of as many males as females as indicating the usage of the sheep for wool, and there was the occasional designation "wool sheep". The Nuzi documents record wethers - 30 in a flock with 11 ewes totalling 52 animals - which Morrison (1981) interprets as indicating an emphasis on wool, but a true wool flock would contain only wethers. Morrison interpreted the 49% does and 38% bucks, in the Nuzi flock of 99 animals (above) as indicating either an interest in goat hair or a preference for goat meat, but they are not mutually exclusive.

In addition to a high proportion of adult females, a milk flock is thought to be indicated by a high proportion of bones from young animals killed to release milk for human use. Such bones are more likely to indicate high kid or lamb losses, and these could have created a surplus of milk, which might have led to the origin of milking. Figure 9 shows one method of avoiding such killing. It is a bone bit from the Norse site of Jarlshof in Shetland, which was put in the mouth of a lamb to prevent it sucking. More recent examples from different parts of Europe are shown in Figure 10. The finding of such bits on prehistoric sites would provide more convincing evidence of milking. There are other methods, such as the bagging of the udder with cloth, which would leave no remains. The Romans restricted access of the lambs to the ewes by housing them during the day while the ewes were taken out to graze. Stone milking enclosures like the old collecting pens in Shetland shown in Figure 11 are another source of evidence for milking that may survive. But enclosures can be made entirely of material that is not preserved.

5 (d) Length of the breeding season

Postgate and Payne (1975) indicate lambing from October to December. The usual time for lambing today is spring, (as in most wild sheep) and few breeds have a sufficiently long breeding season to allow lambing in autumn, which tends to be a specialised adaptation in areas with pasture growth in winter, but not in summer. Since the reproductive cycle (like the wool growth cycle) is controlled by changes in day length, it has been assumed that breeds with a long breeding season evolved in regions nearer the equator with little change in day length. But there is no historical evidence to support this view, and it is more likely that the season has been extended by human selective breeding. It would therefore be interesting if a long breeding season

had been developed by the third millennium BC.

6 (a) Lambing rate

Lambing percentage has several components: (1) fertility (the percentage of ewes conceiving); (2) prolificacy (the number of lambs per ewe lambing - the litter size); and (3) the proportion of neonatal losses. Fecundity is the number of lambs per ewe put to the ram and is the product of fertility and prolificacy. It is indicated by the lambing percentage at birth. But farmers usually record lambing percentage at weaning or "marking" and so take account of early losses. This appears to be the rate evident in the Sumerian records. Future studies may possibly distinguish fertility and prolificacy; lamb losses have already been discussed (above).

From the 2nd millennium B.C. the Gilgamesh legend states: "Thy goats shall cast triplets, thy sheep twins", which suggests that litters of this size were possible and desirable. Postgate and Payne quote 339 ewes with 234 lambs at three to six months of age giving a lambing rate of 69%, which is relatively low. The number of lambs in the flock of Abusch (1981) suggests the even lower lambing rate of 50%. From the Nuzi records, Morrison calculates a minimum kidding rate of 64% (which is low for the fecund goat) and a minimum lambing rate of 78%. This is greater than the 69% quoted above by Payne, but not much lower than the lower limit of breed variation in lambing percentage (fecundity) today.

6 Milk products

I here use ethnographic sources to survey the range of products made from milk, and I shall attempt to define these biochemically by recourse to modern technology. I shall say little about Mesopotamia, which is the area from which the first illustrations of milking are found, as in Figure 6. Goats with spiral horns are being milked alongside sheep. The animals are being milked from behind as are these species today. The collecting vessel is not clear, but there is an illustration from the Early Dynastic period of a vessel for sheep's milk, which has a pointed base like a Greek amphora. Also from this period is a shepherd's hymn, which refers to sheep milking, although Stol (this vol.) states that all milk records refer to goats and cattle. Milk was one of the "secondary Neolithic products" developed after domestication (Fig. 1), which is important for pastoral peoples who live off the products of their flocks. Milk production is a very efficient way of converting vegetable protein to animal protein (Ryder 1983:720) and milking must be more ancient than the earliest depictions in Sumer. Milk, however, is rarely drunk fresh by primitive peoples, and the theme of this account is the diversity of products made from milk, mostly to allow storage.

Figure 12 shows the main processes involved in butter and cheese manufacture. However, there are many more products and their variants (Ryder 1983a; Ryder 1983b). Unfortunately the terminology is often confused and the observer may sometimes have mistaken the product. There is considerable scope for biochemical definition before traditional methods die out. Until recently modern dairy books covered only butter and cheese, but they are beginning to describe other products, although the technologist usually ignores history and traditional methods.

It will be useful to start with the pastoral nomads of Tibet since they make milk products in a logical sequence. (Fig 13). They use some milk to make yoghurt, which I will deal with later, and the rest to make butter. Cheese is then made from the remaining buttermilk. Whereas curdling, the first stage in cheese manufacture, could have been discovered merely from milk left standing, the discovery that churning produces butter required movement such as that obtained by

carrying milk in perhaps a skin bag, which is what nomads still use as churns.

In modern butter manufacture cream is first allowed to come to the surface. Only the cream is churned and this increases the proportion of fat from between 25% and 50% in the cream to 85% in the butter formed. Cheese is made from the remaining skimmed milk. Butter used to be stored in the ground and occasionally crops up in Scotland as "bog butter". In the Middle East butter made from sheep's milk is distinguished by the "fuzz" of wool that can be seen along the edge when it is held against the light. As in the Sumerian relief, goats and sheep are milked from behind, which means that hair and wool are not the only foreign bodies that get into the milk!

Because butter does not keep well in a hot climate it is made into a liquid called *ghee*. This is clarified butterfat, and is made by heating butter or cream and then filtering off the solids formed. Cheese was apparently made in Sumer and Hawkes (1973) states that butter was made, too, while Oppenheim (1964) claims that even *ghee* was made. Postgate (in discussion) confirmed the making of butter and stated that it was immediately converted into *ghee*. Morrison (1981) mentions milk only briefly in discussing the Nuzi documents. According to Green (1980) the signs for milk, cream, butter and cheese are well attested at Uruk, and she states that there was a Sumerian sign for sour milk, but it is not clear whether she equates this (wrongly) to yoghurt or whether there is a separate sign for yoghurt. At any rate she is wrong in discussing an unidentified milk product to list buttermilk, curds and yoghurt as fermented products (see below). She is also mistaken in thinking a goat incapable of producing six times as much milk as a sheep. There is no need to postulate different products to explain this difference. It is a complicated question depending on many factors, but the key factor is that lactating animals need to be well fed to get the maximum yield. So this high yield suggests to me the important observations not only that the goats at Uruk during the archaic period had already been bred for a high milk yield, but that they were specially fed to obtain maximum production.

Cheese manufacture is basically a method of processing milk into a solid product that allows storage for winter consumption. It is highly nutritious, containing 35% fat and 25% protein, compared with 5% in milk. It can be made from whole milk if butter is not being made, or from the buttermilk left after churning whole milk, as done in Tibet, or more efficiently from skimmed milk left after the cream has been removed.

The first stage in cheese manufacture is curdling. Ordinary souring of milk products produces an acid curd and the end product is usually soft cheese. Curdling is commonly speeded by using the enzyme rennin, which acts to convert the soluble protein caseinogen into casein. This in turn forms an insoluble calcium-casein compound. It is possible that this process was discovered by carrying milk in a bag made from an animal's stomach; not only is the stomach a common container used by nomads, but the lining carries rennin. The stomach later became a source of rennet, an impure form of rennin. Varro wrote that rennet from hares and kids was better than that from lambs.

Although there are many variations, the next stage in the process is straining to separate the solid curds from the liquid whey. Archaeologists look for stone or pot curd strainers as evidence of cheese production. However, cheese can be made entirely with perishable materials such as skin or wood containers, and basket or cloth strainers. I had thought that wool cloth might have preceded cotton cheese cloth and in 1982 I actually saw Romanian shepherds straining curds in wool cloth.

The third stage involves varying amounts of pressing the curds to remove the last traces of whey. Again an elaborate cheese press is not required since this can be done with a large stone.

Soft cheeses such as Greek *fetta* and Romanian *telemea* are pressed less and are either eaten fresh or stored in brine. In Turkey, such cheese is packed into goatskins, which appear like large white balloons when the hair is inside, or like dead dogs when the hair is outside! With hard cheese, the curds are repeatedly cut, and there is considerable pressing before a final maturation process, which depends on microbial action and provides the distinction of cheese type.

The Carpathian customs (Ryder 1991d) provide a useful basis for a continuation of the description of the product sequence (Fig. 13). The first product was described as a fresh cheese eaten in summer, but this may in fact be curd since two cheeses are made from it. The first of these is soft *telemea*. The second is a hard cheese, which varies (the manufacture sometimes involving heat) and has different names in different countries. One is matured in a lambskin and another is smoked in the roof of the mountain, cheese-making hut.

Perhaps less well known are the sweet and sour drinks made from the whey, which are known in Poland as *zetyca*. To make these, the whey is heated in a cauldron for 30 minutes at 70°C. This precipitates as granules, which rise to the surface, the 1% protein left in the whey as albumin after cheese making. The top 6 cm containing the granules is skimmed off and this constitutes the sweet version. The remaining clear liquid is known as "lean whey" and this is fed to pigs kept in Europe specifically to consume this by-product. In some countries the entire whey was fed. Those who ask why the pigs were not milked I refer to the paper I wrote with Cranstone (1987).

The sour version of the drink is made by the natural souring of the sweet version for three days, the fermentation process being started by adding some of the sour drink to the sweet drink. If the precipitated solids are strained off instead of being left in the liquid, they can be used to make whey cheese (Fig. 13). A well-known type of whey cheese is Sicilian ricotta, a lacto-albumin coagulate, which is made by heating the whey at 88°C. When acidified with vinegar, the precipitated protein entangles with the less than 1% fat and floats to the surface. The Scandinavian version, *myoset*, contains caramelised lactose. The wide distribution of whey cheese indicates great antiquity.

A very hard dry cheese is made by drying precipitated casein from Mongolia throughout the Middle East as far as North Africa. It is often carried as powder and reconstituted with water to be added to various dishes. In Mongolia this dry cheese is known as *beslag*, and the Bedouin of the Middle East are said to make it from yoghurt by boiling, straining and drying, just as they are said to make *ghee* by churning yoghurt (alluded to by Stol, this vol.). The involvement of the fermented product yoghurt adds a new dimension to the inter-relationship of the range of products, but it is not clear how yoghurt (which is not the same as sour milk) can be involved in both butter and cheese making. There is at least one product which is intermediate between cheese and yoghurt. This is the Icelandic cream cheese *skyr*, which is produced by rennets containing lactic flora and so is a "yoghurt cheese".

Fermented products appear to be less well-documented and the inter-relationships are less clear. *Kumiss* (Fig. 14) is made in Mongolia from mare's milk after churning to remove the butterfat. The skin bag in which the remaining butterfat is fermented is never cleaned out, so the necessary micro-organisms are always present. The liquid is stirred with a paddle and the *kumiss* is ready for drinking in 14 days, when it is as strong as beer. The process can be compared with the fermentation of fruit juice in the West for storage as wine. The flow diagram in Figure 14 shows the modern technologists' imitation of the fermentation process, which is incidentally a biotechnological method of producing alcohol. *Kumiss* can also be distilled to make "milk vodka".

With other fermented products such as *kefir* the fermentation goes further to produce acid. This liquid is made in Russia and although I have drunk it, I know nothing about the traditional manufacture. In modern technology (Fig. 15) the fermentation is initiated by *kefir* granules, which are dried milk solids containing lactose-fermenting micro-organisms. There are similar and also intermediate products, which I will not detail.

Yoghurt is the Balkan name for another fermented product, which has different traditional names in other (including Middle Eastern) countries. It may have been discovered in the udder of a dead animal since the bacteria responsible for the fermentation grow best in the absence of oxygen. These bacteria are well documented as is the traditional manufacture. The modern Western product with added fruit juice (Fig. 16) bears little resemblance to genuine yoghurt made in Bulgaria from ewes' milk. Since the culture remains viable only one or two days, yoghurt-making must have spread with the animals.

Yoghurt emphasises a theme of this account, which is the use of micro-organisms to either start, make or mature milk products, which therefore provide an example of the biotechnological achievements of early pastoralists who were able to exert an amazing degree of control without recourse to a modern microbiology laboratory.

It will be useful to end with a summary of the products made by the Kurds of northern Iraq today.

1. Spring milk is made into butter and sour skimmed milk, which is boiled to make *biza* cheese or *jajy*.
2. Whole spring milk is curdled with rennet to produce either (ordinary) *roos* cheese or, when heated, *meira* cheese.
3. The whey from either *jajy*, *roos*, or *meira* with one-tenth whole milk added, is boiled to give *lour* cheese.
4. The summer milk is all made into *ghee* called *deehin*. This illustrates that butter can be made in the spring, whereas in the heat of summer the end product is *ghee*.

Finally, it is worth pointing out that unlike the situation 30 to 40 years ago, when advisers to developing countries tended to destroy what were imagined to be primitive traditional methods in agriculture, the approach today is to improve the traditional method. The result is that in describing the improvement, the traditional method is documented, and FAO journals are a good place to look for such accounts. For example, in the *World Animal Review* for April-June 1987 there is a paper on options for smallholder milk processing in Sub-Saharan Africa (O'Mahony and Peters 1987) and another on the potential for goat-milk production in Western Kenya (Boor et al. 1987). Indeed, I was instrumental in getting a description of traditional Chinese goat-combing for cashmere published in the same journal (Li Jian-Ping 1988).

7 Textiles

Decoration by surface appliqué has suggested that the first fabrics were of felt. Despite the skin kilts, cloth must have been woven at the same time, because in the mid-third millennium BC there is the illustration of a loom from Susa, and loom weights of the same date have been found. Ochsenschlager (this vol.) refers to spindle whorls of 2400 BC. The lighter whorls he refers to could have been used to spin shorter fibres (possibly flax) (Ryder 1983a, 748), while the heavier whorls could have been used for plying the yarns, a practice for which he gives evidence.

Spinning and weaving were originally carried out by women in the home, but not long before 2000 BC cloth manufacture was organised by the temple almost on a factory system and men were involved. After 2000 BC spinning was again done by women at home, while weaving was carried out by men in the temple, where people worked for the state. Wages were paid in wool and wool garments. Natural brown and black cloth was made and white wool was dyed. This illustrates the interaction between technological and biological change which interests me - just as there was no incentive to breed for continuous wool growth before shears had been invented, so the breeding of sheep with white wool was associated with the development of dyes.

Workers later took yarn home from the temple and brought it back as finished cloth, so foreshadowing the practice of eighteenth-century Yorkshire. Thousands of people were employed in the manufacture of wool cloth for export in return for wood and copper, so Sumer had the first economy based on wool. The Hittites obtained cloth from Babylonia, and in about 2000 BC cloth went to Bahrain in exchange for ivory and precious stones probably from Harappa. In a note on Nuzi textiles, Zaccagnini (1981) reported the manufacture of standard cloths six mina in weight, 15 *ammatu* long and five *ammatu* wide. Carpets are depicted at Sargon's palace, Khorsabad. See also Powell (n.d.).

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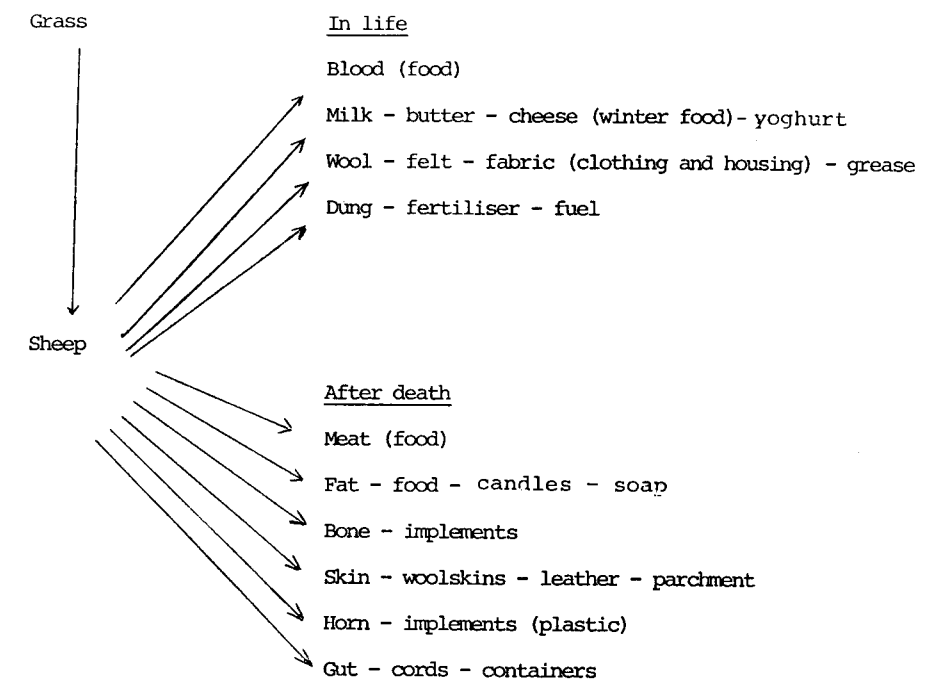


Fig. 1. Summary of the main products obtained from sheep. A product not included that has relevance to the present account is sinew (i.e. the tendons linking muscle to bone) which are largely composed of collagen and so akin to skin and gut. (From Ryder 1983a: 713).

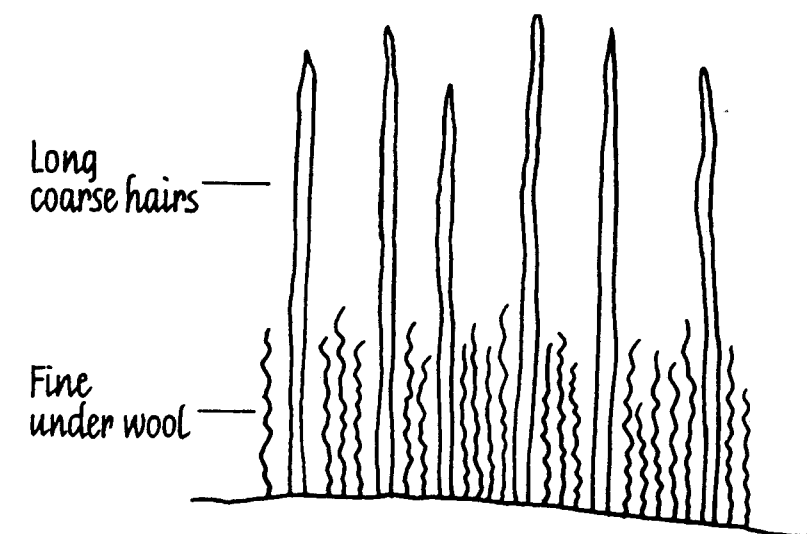


Fig. 2. Structure of the double coat in the wild ancestors of sheep and goats. (From Ryder 1983a: 16).

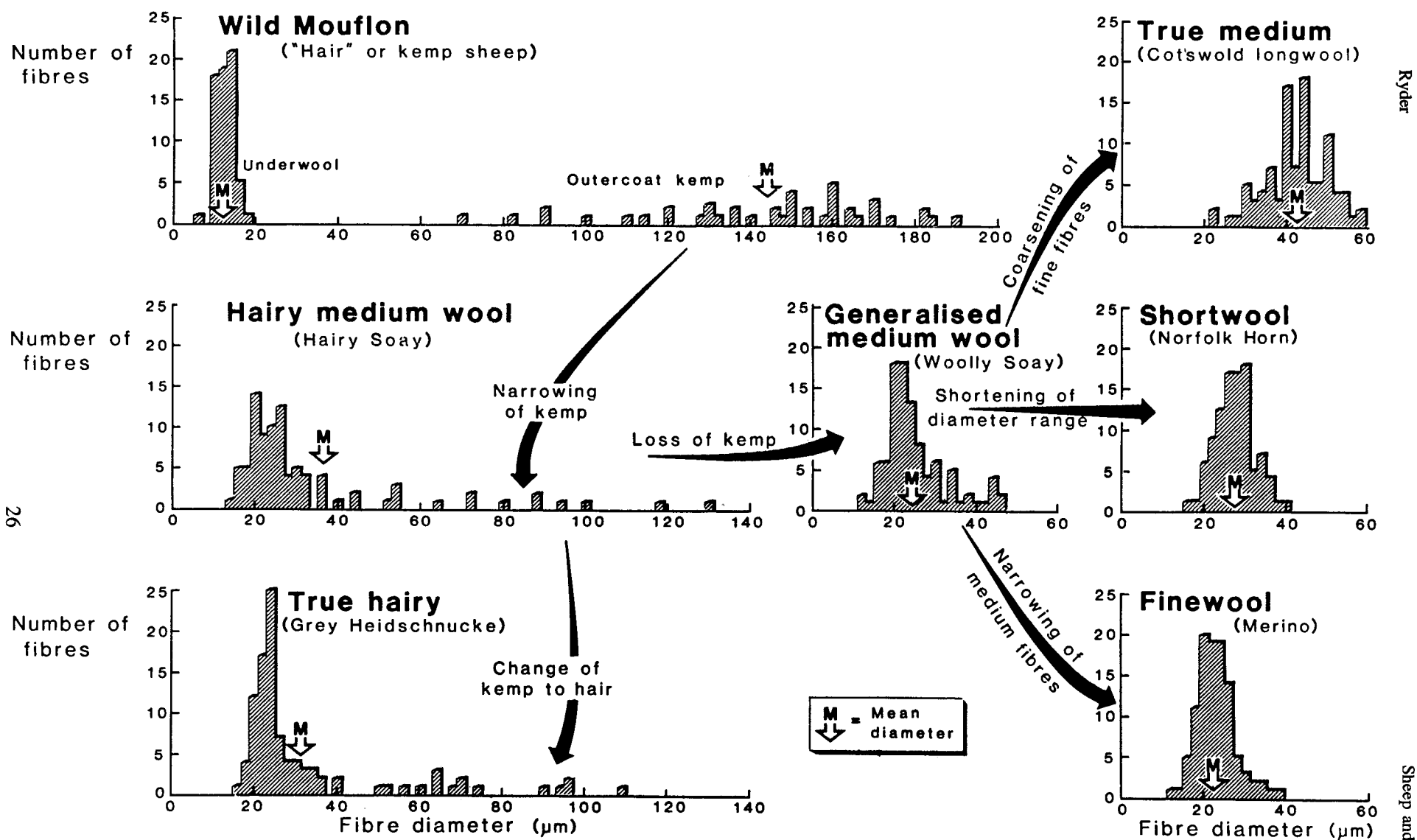


Fig. 3. The way in which changes in wool fibre diameter distribution led to a range of fleece types during fleece evolution. (From Ryder 1983a: 46, 131).

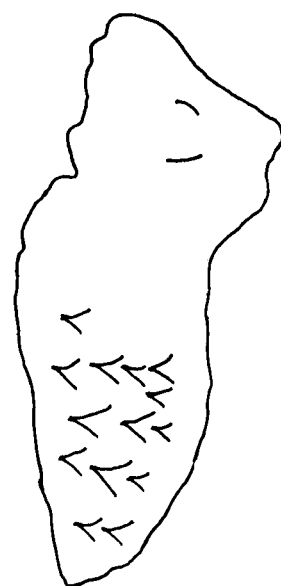


Fig. 4. Clay sheep figurine from Sarab, Iran, c. 5000 BC, showing V shaped wool staples, which appear to represent a Hairy-medium type of fleece. (From Ryder 1983a: 52).



Fig. 5. Vase from Uruk showing sheep without a fleece. The rams have corkscrew horns and a throat fringe, but the ewes are polled. (From Ryder 1983a: 88).

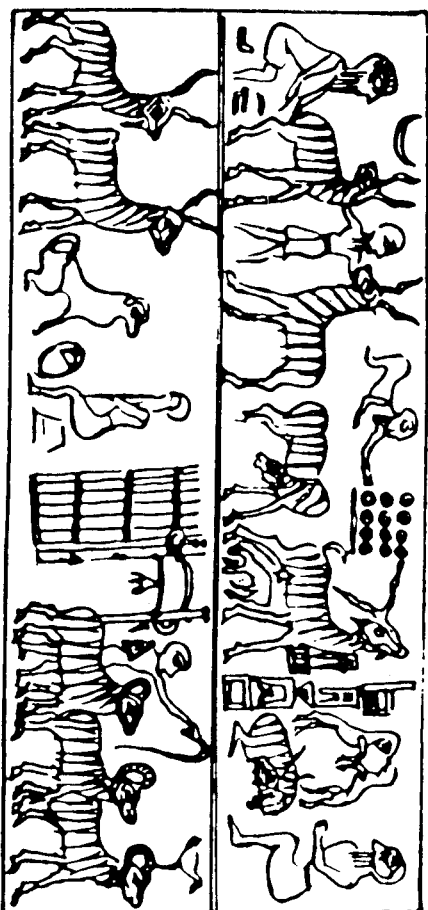


Fig. 6. Sheep and goat milking on La Haye cylinder seal c. 2400 BC. Corkscrew-horned goats are being milked top and bottom left. There are kids (top right) the presence of which helps in the let-down of milk. The beard of the animal at bottom left confirms the identification as goat and next to these two goats sits a herd dog. There are sheep with normal "horns" at the bottom right. (From Ryder 1983a: 721).



Fig. 7. Sumerian sheep with “normal” horns and a clear fleece indicated by individual wool staples - provenance unknown (British Museum: WA 92989). (From Ryder 1983a: 89).

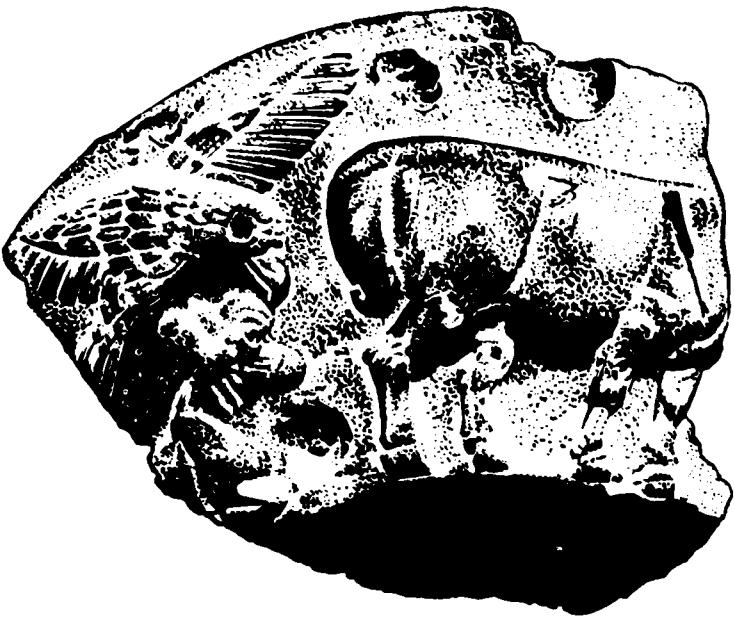


Fig. 8. Bowl from Uruk III c. 3000 BC showing a sheep without a fleece but with a fat tail of medium length (broad tail). (From Ryder 1983a: 90).

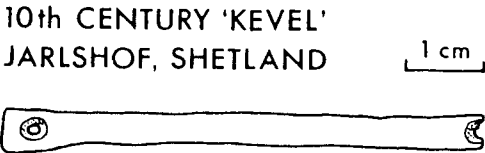
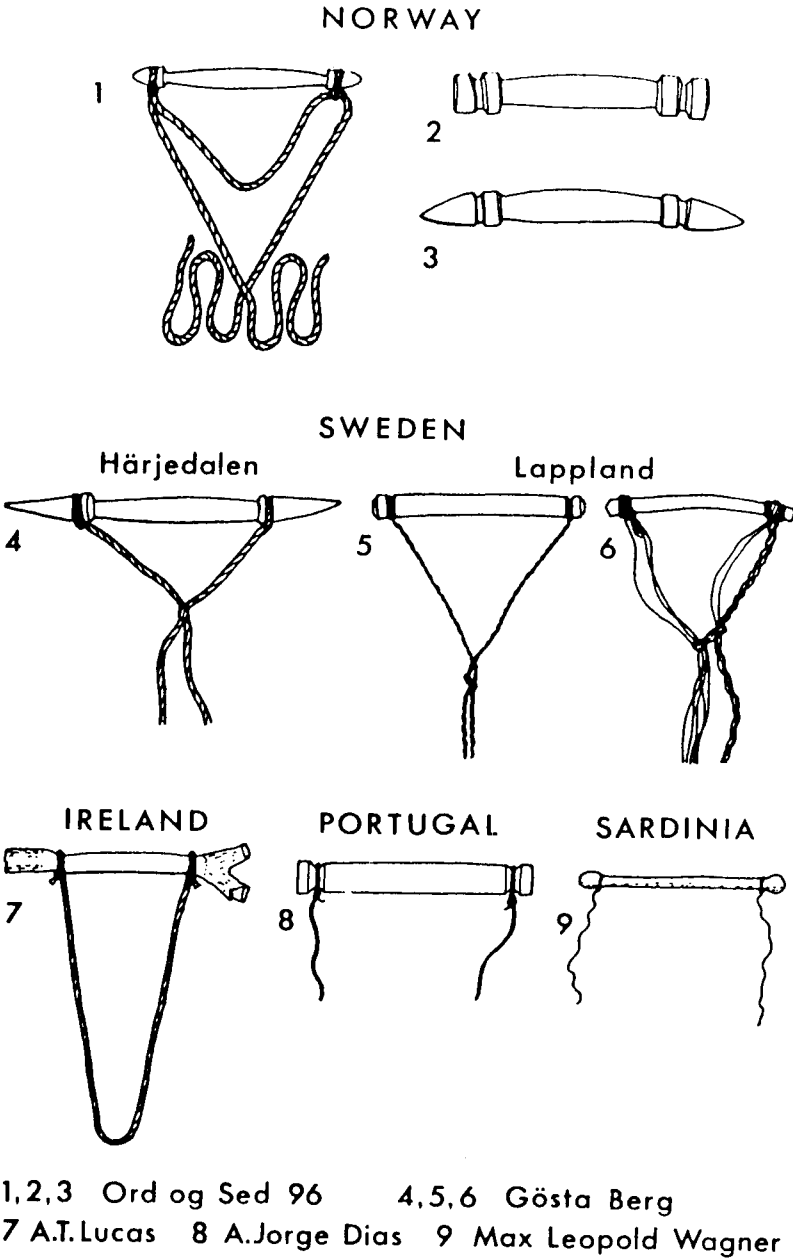


Fig. 9. Norse bit from Jarlshof, Shetland, put into the mouth of a lamb to prevent it sucking. (From Baldwin, J.R. (1978) (ed), *Scandinavian Shetland*, Scottish Society for Northern Studies, Edinburgh).



1,2,3 Ord og Sed 96 4,5,6 Gösta Berg
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Fig. 10. More recent anti-sucking devices from different countries. (From Baldwin 1978).

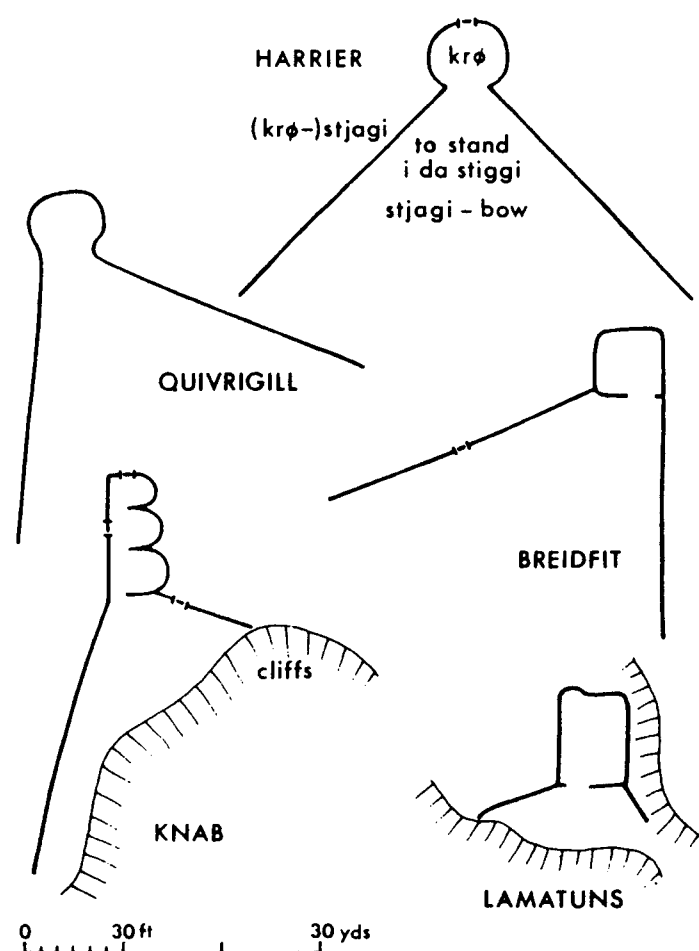


Fig. 11. Plans of old collecting structures and milking pens in Shetland. (From Baldwin 1978).

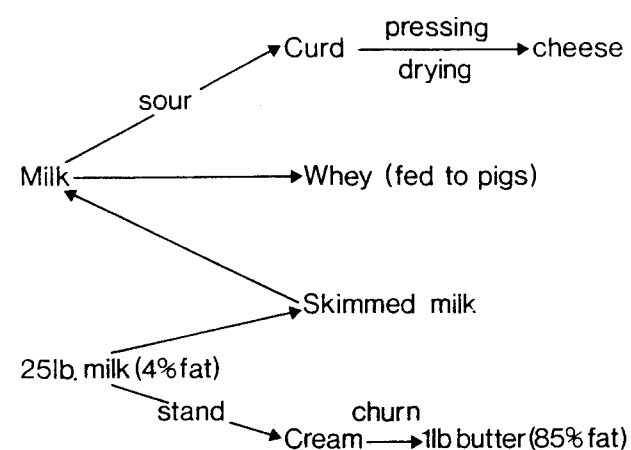


Fig. 12. The relationships of butter and cheese. (From Ryder 1983a).

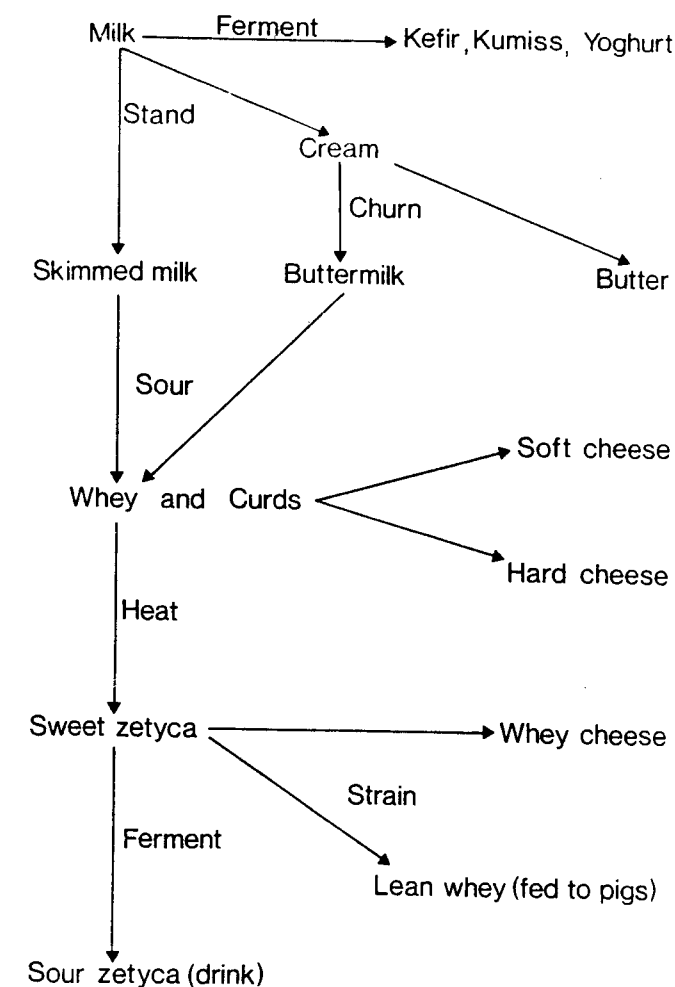


Fig. 13. The relationships of most milk products. (From Ryder 1983b).

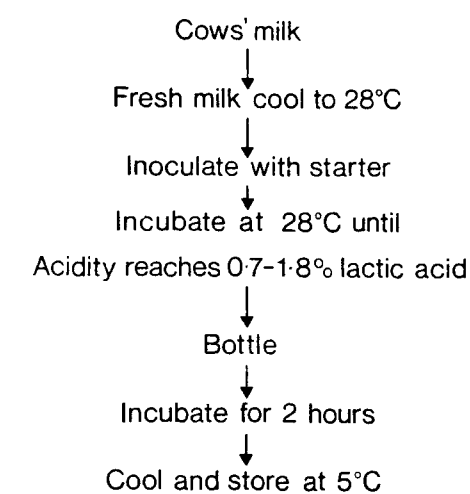


Fig. 14. Flow diagram of modern *kumiss* manufacture. (From Ryder 1983b).

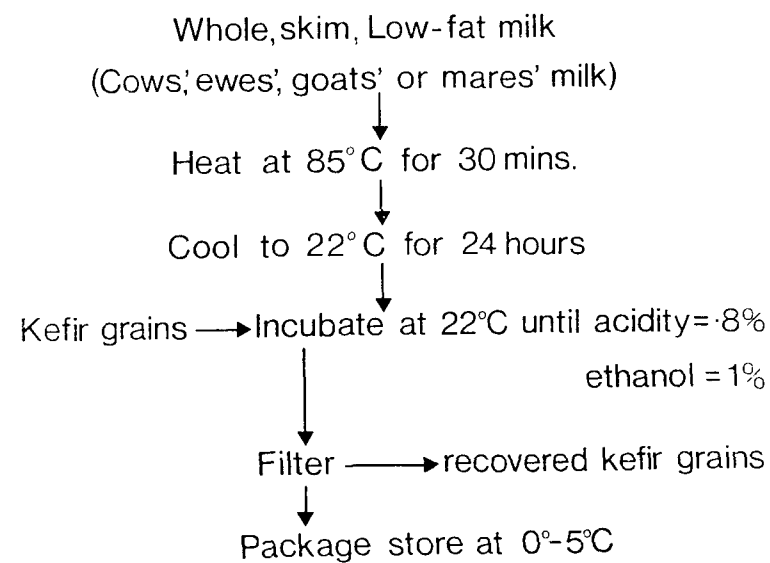


Fig. 15. Flow diagram of modern kefir manufacture. (From Ryder 1983b).

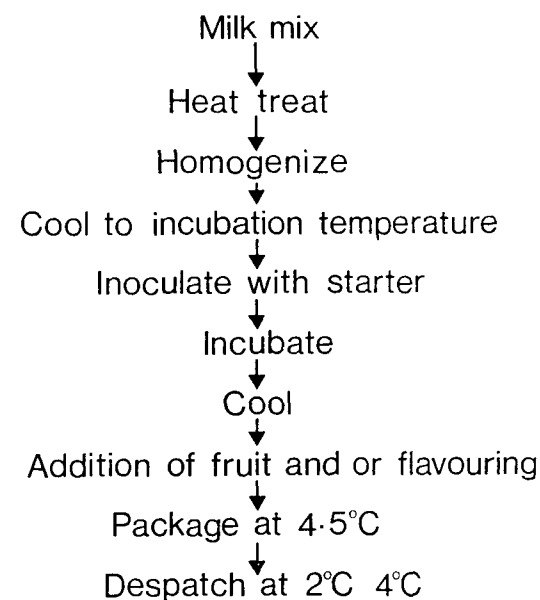


Fig. 16. Flow diagram of modern yoghurt manufacture - the addition of fruit is a modern, western idea. (From Ryder 1983b).

SHEEP: ETHNOARCHAEOLOGY AT AL-HIBA

E.L. Ochsenschlager

(The City University of New York)

— A project to determine the possible bearing of modern ethnographic information on some of the archaeological data was undertaken during the 1970–1971 and 1972–1973 seasons of the excavations at Tell al-Hiba in southern Iraq. The information reported in this paper was collected at that time with the support of the National Endowment for the Humanities and the Research Foundation of the City University of New York.

The following description is based on information collected in the seven Beni Hassan villages closest to Al-Hiba (Alwan, Hagi Rachid, Said Tahir, Sahar, Khalil, Harran, Bohan) during the 1970–1971 excavations. These villagers did not keep goats. Some had tried in the past but claimed that goats did not do well in this environment on the edge of the marshes and were subject to many diseases especially in the summer. It does not include, except in passing, data concerning the large flocks of sheep and goats owned by Bedouin tribes who regularly arrived in the area at the end of September and moved on during the month of December. It is interesting to note, however, that the villagers never purchased breeding stock from the Bedouin although the Bedouin's sheep appear to have a significantly higher rate of fertility than the local strain. Both Bedouin and villagers agreed that the mortality rate among the Bedouin sheep of all ages, if confined to this area the year around, would be greater than seventy-five percent. The life style of the migratory Bedouin shepherd would appear to be a necessity for the health of his flock. The Mi'dan who lived here did not keep sheep or goats.

For most of the year sheep secure their sustenance from the grasses and sedges available at pasture but during the winter there is a period of up to four months when little or no pasturage remains and they must be fed grain. This period can be shortened to two or three months for those who have land on the edge of the marsh or those who own a piece of irrigated land. The receding of the marsh during the late summer and early fall causes new grazing land to appear up to the time of the first winter rains. Growth can be forced on irrigated land in late summer sufficient to carry small flocks of sheep into the early winter. An individual sheep without sufficient pasturage is fed two handfuls of barley twice a day.

During the day sheep are guided and guarded at pasture, usually by a young boy or girl but sometimes by an older woman of the family. The shepherd's duty is to guard the sheep against predators and guide them to the more succulent patches of growth available without trespassing on pasturage claimed by one's neighbor. Conflict resolution of pasturage claims among residents of the same village is usually mediated by a sheikh or religious figure in the village *mudhif* and a solution found in consensus.

Resolution of conflicting pasturage claims between individuals from different villages is not so simple and can result in serious and prolonged inter-village quarrels.

Shepherds are usually assisted in their duties by one or more dogs. In spite of the dogs' lowly position in the area, some become quite adept at the simple guiding of sheep. As no one takes on the job, or admits to doing so, of actually training the dogs, they must pick up details of herding from other dogs. Dogs with herding abilities are treated quite differently from run-of-the-mill animals. They are singled out as recipients of whatever scraps of food are

discarded, encouraged to stay near the compound and given some protection against other dogs. Dogs are also useful as they fiercely guard their own sheep from would-be predators and give loud warning at the approach of strangers. Common predators include other dogs, foxes and jackals (*wāwi*) which prey especially on the lambs. One must also be on guard against personal enemies or hungry people from other villages who may carry off an unguarded sheep, kill it and eat it leaving little or no evidence of the crime.

During the night the sheep are kept within the courtyard for their own protection. If their owner keeps other animals as well, the sheep are usually provided with a fenced enclosure at one side. Sometimes an owner maintains a sun-dried *pisé* mud watering trough within this corral. Other owners, however, believe that it is not necessary for the sheep to drink during the night's confinement as long as there is ample water available during the day.

Just outside the courtyard, on the most sheltered side of the compound, is a feeding trough made of sun-dried *pisé* mud where the sheep are fed their grain rations in winter. Even in the winter, except in the most inclement weather, the sheep are herded out of the courtyard in the morning and kept outside until late afternoon.

Most herds of sheep belonging to an individual owner are rather small consisting of 8 to 10 ewes and a ram. On the other hand, several members of a family may have their own individual herds but tend to graze them together so that in the countryside herds look much larger. The largest individually owned herds in the area (aside from the herd of the most powerful local sheikh which numbered 126) were one of 35 sheep and another of 47. Most herds in this area are begun when a boy is given a ewe from his father's flock. Those not so lucky can begin a herd by buying one or more sheep. A proven ram costs about ID 35, a good ewe ID 25 and a lamb can be bought for ID 10 to 15 depending on its age and condition.

Most individuals with sheep own their own rams. In family herds each individual member usually owns his own ram as well as ewes and there are several rams running with the flock throughout the year. One ram is considered ample for 10 to 15 ewes. There are two breeding seasons falling roughly from the end of April through June or from August through October. When rams run constantly with the herd, lambs are usually born from September to November or from the end of January through March. Ewes with newborn lambs are not separated from the flock, but their lambs are usually carried to and from pasturage by the shepherd. Some individual owners do not have rams for their herds and borrow one from a neighbor. Usually a ram is borrowed for the months of April through July or August through October in return for special favors, to satisfy an obligation of the owner, or sometimes for the promise of one or more of the resulting lambs. The ram's owner can then use the ram in his own flock during the alternative breeding season.

A few owners separate the ram from any contact with ewes from the end of October through March and give it special pasturage and added rations. It is nearly universally believed that the condition and number of lambs is dependent on the virility of the male.

Most rams are decorated with colored wool yarn or strips of colored cloth tied into the wool of the tail near its juncture with the body. Especially prized ewes (because of production) or especially comely lambs (conformation) are also decorated, but usually on the neck. Such decoration may be with colored yarn, or cloth or even dye applied to strands of the sheep's own wool. Sickly sheep of any age may be decorated with one or more amulets to ward off evil spirits.

Average production in the flock consists of 50% of the ewes giving birth to a single lamb. If 60% lamb it is considered a very good year. Twins are rare and when they do occur usually only one survives. One ram who produced healthy twins in 1969 was still pointed out in 1971 to strangers as an especially virile member of his species. The ordinary owner of a flock tries to keep all the ewe lambs and either eats, sells or barter the males, except for one or two of special "beauty" (conformation) which are kept as future herd sires. Scarcity of food or social obligations often make it necessary to butcher female lambs as well.

Inquiries as to what size herds individual villagers would eventually like to own reveal a deep division between reality and aspiration. Answers begin at 50 head and go up to astronomical figures. The more realistic limiting factors here seem to have to do with the amount of pasturage available, the sizable cost of barley necessary to winter the flock, and the loss of sheep through predators and disease. When this is pointed out to someone who has just said he would like to have 200 sheep, he inevitably replies that if he had 200 sheep he would be rich enough to buy all the feed he needed and feed his sheep on barley the year around and could more easily bear the losses from predation and disease.

Actually, losses of sheep to predators, whether human or animal, are rather minimal. Close guarding of the sheep by members of the family and the family dogs as well as the habit of confining the sheep to the courtyard at night successfully prevent most predatory attacks. During 1970 only two of the 615 sheep in the neighboring villages were lost to predators.

Disease, injury and treatment of the same account for more substantial losses (28 in 1970). Branding with a hot *shish* is the most prevalent form of treating the symptoms of disease. A sheep that staggers is branded on the top of its head, while one that loses orientation and wanders around in tight circles is branded behind the ear opposite to the direction of its revolutions. When a sheep breaks out with pustules it is branded on its chin, while a ewe having difficulty giving birth to her lamb is sometimes branded just below the vulva. Most sheep owners, however, are quick to recognize the nature of the difficulty in a delayed birth and are adept at correcting a lamb's presentation by thrusting their hand into the ewe's vulva, by helping to pull an oversized lamb or even by cutting up a dead lamb within the ewe in order to save her life. For the treatment of surface cuts a preparation is made of equal parts of molasses (*dibis*) and flour or of sugar and flour. This preparation is spread on the wound which is covered with a cloth soaked in the same mixture. The cloth is secured over the wound with strips of rush and left for one month.

The highest mortality rate of all is among the lambs during their first winter as a result of frost or heavy rains. This is reflected in the local nomenclature for ages of sheep. In addition to giving the actual numerical age of a sheep you can say that the sheep is old, five to six years (*hirfi*), that the sheep is one who has survived the first winter (*shitwi*), or that the sheep is one who has survived the first chill of winter (*shillāwi*). During 1970 over 40 new lambs were said to have died from "winter complications".

The lack of sufficient pasturage, especially in the fall, which leads to a prolonged period of costly supplemental feeding also seems to provide a major limitation on herd growth. In view of this it is difficult to understand the easy acceptance of the Bedouin who arrive in the area in late September with large flocks of sheep and goats. The Bedouin flocks graze on the newly emerged and emerging grasses and sedges along the edges of the marshes which would otherwise be used by the local villagers' sheep. Although this would seem, in effect, to limit the size of local herds by depriving them of additional forage, it is tolerated because it is both customary and economically advantageous. Both Bedouin groups which spend time here have a weaving family.

They trade woven goods for villagers raw wool or for the *sijada* and *bsat* made by village craftswomen. In an economy where cash is hard to come by, it allows the villagers to barter their wool and wool products directly for the cloth they need for clothing and blankets (see following article on Weaving).

Shearing

Shearing of sheep takes place from the middle of April to the middle of May. Exact timing of the operation seems to be dependent on 1) the arrival of the *kawli*, itinerant gypsies who serve as the local blacksmiths and who sharpen the *zaww*, special scissors used for shearing, 2) the availability of the shearers, for there are only two or three men in the area generally regarded as competent shearers, 3) the weather and 4) the personal inclination of the herd's owner. Two or three days before the beginning of the operation the owner, usually accompanied by several members of his family, takes the sheep to a nearby canal or into the shallows of the marshes. The sheep are washed with water. A soap made of the ashes from the *tanur* is used on especially stubborn stains and matted hair is pulled apart.

On the day of the shearing the families *mudhif* or reception room is prepared by thorough sweeping, and reed mats, old cloth or sacking is laid down near the open doorway to protect the sheep's fleece from dirt. Usually three or four friends of the owner are present in addition to the shearer. The shearer has previously made arrangement for reimbursement. Sometimes this takes the form of returned favors, sometimes he shears for a portion of the wool (an average of 10%), or sometimes for money (50 to 100 fils per sheep).

Sheep are brought into the *mudhif* one at a time from their night corral in the courtyard. The sheep is thrown on the cloth or matting by seizing the two legs on the side of the sheep furthest from the shearer. It is then pulled over on its side while the shearer retards and softens the fall with his own legs. Three of the sheep's feet are tied together with a length of cloth (never rope or twine as this may cut into the sheep's flesh).

The shearer starts on one side near the neck, works down the flank, around the tail and rear, over the back and down the other side. The tops of the legs are done last. The blades of the shears are forced through the wool and then pressure exerted to cut. This is very hard work, requiring enormous pressure even when the shears are at their sharpest. The handles of the shears are wrapped with raw wool to help protect the shearer's hands. Results are somewhat ragged, preserving a coat of wool on the sheep varying from 3 to 6 cm. in depth. The wool is left intact around the neck, on the head, on the belly and on the lower legs. Otherwise I was told "the sheep would not look like a sheep" or "it would look ugly rather than beautiful".

Inevitably the skin is sometimes nicked with the shears. A compound composed of equal parts of ashes from a *tanur* and salt is applied to such cuts. While the shearer is at work, the owner and whoever else is about keep their eyes firmly on the sheep searching out ticks (*grad*, sing. *gardeh*) which were previously undiscovered, pulling them off when one attracts their attention and squashing them.

The finished sheep is ushered out the door and put in charge of the shepherd. The fleece is stretched out, with leg wool and other fragments placed in the center and then rolled up. Two twists of wool pulled up from the bundle are used to tie the roll together. Before use by the villagers, the wool will be unrolled on mats and exposed for three to four days to the hot sun of summer. Another unshorn sheep is then brought in. Between every three sheep, at the beginning, and every two sheep later on, rest periods of increasing length are taken for cigarettes and tea

furnished by the sheep's owner. A longer break is taken around noon during which the host provides dinner for the shearer and his other guests.

Use of sheep skins

Sheep skins can be sold to commercial leather makers in Shatra and Dawiya or processed at home for use as containers for liquids, churns, covers for drums, straps, belts, etc. The home process, while fairly simple, does not result in leather of the same quality or as long lasting as the commercial process.

Wool is plucked from the outside of the skin and the flesh is scraped from the inside of the skin with a sharp knife. The skin is then spread out and dried thoroughly in the sun. Water is heated in a large vessel over an open fire and ash from the *tanur*, lye, salt and dried pomegranate skins are added. The mixture is brought to a boil and then allowed to cool. When fully cool the skin is added and the mixture is heated almost to the boiling point. After cooling the skin is removed and thoroughly scraped on both sides. This process is usually repeated either two or three times. After a final drying the skin is ready to be cut and sewn into the desired form.

Sheep manure

Sheep manure plays an important role as fuel in the ordinary household. The householder usually has three fuel choices: reeds, sun-dried dung patties and sun-dried pellets. Those who do not own cows or water buffalo can make, with somewhat more effort, dung patties from sheep manure collected from the courtyard or courtyard pens after the sheep have been turned out for the day. Such material is usually fresh and moist enough to be worked with straw or dried verde into respectable patties which can be dried in the sun. Sun dried pellets, collected from the pasture are especially used for making coffee and tea. Initially they burn hotly enough to bring water to a boil and later, like hot coals which have lost some of the intensity of their heat, keep the brew warm without over boiling.

Sheep blood

Blood from a freshly slaughtered animal is considered to have important apotropaic powers. It is absolutely necessary that new rooms be marked with this blood either administered from the severed head or, preferably, by hand in such a way as to leave a bloody hand print on the wall and door posts. Such treatment is said to prevent evil dreams (nightmares) amongst the inhabitants. It is also sometimes applied by finger to the ailing part of an animal or human being in order to aid recovery.

Sheep meat and fat

The preferred age of lambs for food is between 6 and 8 months. Large dinners of an important sheikh feature a whole lamb served atop a tray filled with rice. Grease from the sheep is poured over the rice and should drip from the sides of the tray to indicate the bountiful hospitality of the host. The tray is borne to the center of the *mudhif* by two or more strong men the sleeves of whose *dishdashas* become soaked with the juices leaking from its rim. They place the tray on the floor which has been spread with woven reed mats or oilcloth.

Men eat, squatting on their haunches, with their right hands. When a man eats depends on his status and the number of people who can crowd around the tray at one time, sometimes in two concentric circles. Once the first group has finished, another takes its place until all the invited guests have eaten their fill. When the men have finished eating, the somewhat depleted

contents of the tray disappear into the women's quarters. When the women are finished the children take their turn. Although the host will eat apart, from a portion saved for him after the men have finished, he or someone he has designated will likely sit next to an honored guest at the first serving and feed him the choicest morsels with his fingers. These choice parts, in descending order of local delicacy, include the eyes plucked from the carcass, the ear lobes with a bit of hair attached, and the rather strong fat from the base of the sheep's tail. Fat is often more popular than meat, a phenomenon explained by the extremely low fat diet of the ordinary villager.

A "formal" dinner given by an ordinary member of the community usually features a leg and part of the fat tail of the sheep. Sometimes these are served on a large tray, but sometimes they are pulled apart and apportioned as a garniture to several smaller dishes filled with rice. Each of these smaller dishes will serve two or three people. The host serves the food and then disappears until his guests have finished eating. His presence, it is felt, might cause a guest to eat either more or less of something than he really wants.

The favorite sheep dishes at "informal" dinners, where the host is present, are rich, fatty stews made from other parts of the sheep. Chicken or fish can be substituted for sheep at these affairs.

All kinds of dinners include freshly baked bread (*khubuz*) and a number of side dishes including vegetables, condiments and sweets. Hands are washed before and after the meal with water poured over them by the host. It is appropriate at the end of the meal to catch some of this water in one's hands and use it for rinsing out the mouth. During a meal there is no conversation. The objective is to put away the necessary amount of food as quickly as possible. Noises of appreciation such as belching or smacking of lips are considered good manners. Conversation starts when the host begins the ritual of serving coffee and tea.

Because meat does not keep well in this climate and because there is no refrigeration, a series of complex arrangements or agreements with others provides for the distribution of the meat the family will not use in a day or two to other families in the village. They are then obliged to return in kind the portion of the animal they received the next time they slaughter a sheep.

Local terminology for sheep

Sheep by Sex

Male	<i>dhakar</i>
Female	<i>untha</i>
Ram	<i>kharūf</i>
Ewe	<i>na'jah</i>
Male Lamb	<i>fahl</i>
	<i>ṭ(i)li</i>
Female Lamb	<i>ṭ(i)līya</i>

Sheep by Age

One who survives first chill of winter	<i>shillāwi</i>
One who survives the first winter	<i>shitwi</i>
"Old", five to six years	<i>hirfi</i>

Sheep by Size of Ears (Representing Two Different Strains)

One who has short ears	<i>tamsha</i>
One who has long ears	<i>ausiya</i>

Sheep by Color

White	<i>baydha</i>
Red (Dark Brown)	<i>hamra</i>
Yellow (Light Brown)	<i>ṣafra</i>
Black	<i>ṣawda</i>
Grey	<i>ashma</i>

Sheep at al-Hiba 1990 (Afterword – 20 Years Later)

Some of the most dramatic changes at al-Hiba in the last few years, the complete absence of the Mi'dan and Bedouin and the progressive draining of the surrounding marshes, have increased the amount of land available to the local villagers for grazing sheep. One would expect to find a large growth in the sheep population, but this is not the case. A few more people keep sheep than did before, but average herd size has grown by only two or three animals. Part of the reason for this is certainly to be found in the diversion of some of the best land to the raising of vegetable or barley as cash crops on plots of newly irrigated land. This has been made possible by the widespread ownership of water pumps.

Another reason is the increased market for fish which occupies many of the village men now that roads permit potential buyers to come right to one's door or provide cheap and quick transportation to the near-by market towns. Both fishing and raising of crops are labor intensive and the farmer-fisherman can make use of even his youngest children, a part of whose day is already occupied by attendance at school. Consequently shepherding has become a part time job for most members of the family, depending on who is free at what hour and on what day.

A third reason is perhaps the most important of all. Although the wool is a cash crop (it sold in 1990 for I.D. 6 to 7 per fleece) a good part of that income goes to purchase the barley for winter feeding. Nor is there any attempt to optimize one's income from the wool, for, as in the past, a very significant part of the fleece is not harvested for aesthetic reasons. The main purpose for keeping these small family herds would appear to be the meat they furnish for the family, with the sale of wool and an occasional sheep a secondary consideration. The present day widespread availability of electricity and ownership of freezers has increased the frequency with which meat appears on the family menu.

It is important to note that fewer sheep are now lost to disease and the treatment of the same. If a sheep becomes ill its symptoms are reported to the veterinarian living in Shatra, and appropriate remedies secured and administered. The use of a hot *shish* in the treatment of sheep disorders has almost completely disappeared. Cuts and abrasions are still mostly treated in the old way, unless they become infected, and amulets are still often tied to the sheep in order to assist in its cure.

Plate I



2. Tying a sheep skin in place on a drum. The gullet of a pelican or the skin of a carp is preferred for drum heads.



3. Tying off a filled sheepskin churn.



4. Kneading the milk-filled skin to produce butter.

Plate II



1. A *pisé* mud feeding trough built against a wall outside the courtyard.



3. Group of sheep. Note colored cloth tied around neck of lamb in the foreground.



2. A shepherd and his sister with a prize lamb. Sheep in background has been shorn.



4. A herd sire with his proud owner. Note braided and dyed tuft of hair on his tail.

Plate III



2. Shearing in progress outside for the sake of the camera. Neighbor pulls back wool as shearer cuts it with his shears.



4. Rolling out the fleece.



1. Shearer holding his *zaww* or shearing shears by their wool-wrapped handles.



3. Owner searches out ticks while the shearing is in progress.

VILLAGE WEAVERS: ETHNOARCHAEOLOGY AT AL-HIBA

E.L. Ochsenschlager

(*Brooklyn College, City University of New York*)

A project to determine the possible bearing of modern ethnographic information on some of the archaeological data was undertaken during the 1970–1971 and 1972–1973 seasons of the excavations at Tell al-Hiba in southern Iraq. The information reported in this paper was collected at that time with the support of the National Endowment for the Humanities and the Research Foundation of The City University of New York.

The site of al-Hiba is located in the Mohafada of Nassiriyah. It is completely surrounded by water, with marshes on three sides and a canal (Abu Simich) on the fourth. Communication with the outside world is via a one and a half to two hour trip up the canal by motor boat to a road leading to Shatra, the nearest and most accessible town. In the more immediate area of the mound (Tell al-Hiba) are a number of small villages whose people are largely dependent on the produce from small plots of land, small herds of sheep, goats, and water buffalo, and on fish netted or speared in the canals or marshes.

Although the pattern of life is changing rapidly in these small villages of southern Iraq, certain aspects appear to have remained remarkably constant over the nearly four and a half millennia which separate the Sumerian period from the present. Archaeological evidence reveals striking parallels in various crafts. There is even some reason to suppose that the general ecology of the area, while more carefully controlled in ancient times, was not too different from what it is today.

Preparation for spinning

Among the modern villagers in this area, only sheep wool is regularly used for spinning and weaving. All of the weaving and related crafts are practiced solely by women except for spinning and twisting thread into yarn for very specific purposes such as the making of slings, fish nets and braided or twisted cords.

If they are especially dirty, sheep and goats are washed, usually in the running water of a canal, with a soap made from the ashes of a reed fire mixed with oil and clean mud. This preparation is also used as a soap for other cleaning purposes. They are then shorn with a pair of shears. Among the Bedouin, the wool is often washed once more and then further combed and teased by hand. Wool is salvaged from a dead sheep by plucking, but this wool is carefully segregated and never used for rugs or carpets.

Spinning

The spindle (*mughzal*, pl. *maghāzil*) consists of a long reed shaft with a whorl made from one or more oblong sections of reed or wood drilled to fit on it. The hole is almost never dead center and the whorl never in perfect balance. If the spindle is to be used only by men, the tip of the short end of the shaft is notched, if only by women, the tip of the long end. Occasionally it is notched at both ends so it can be used interchangeably by either sex.

Men use the "drop and spin" method, twisting the short end of the shaft to the right with the fingers of their right hands, they let the spindles drop, spinning, while they tease out wool with the fingers of their right hands from the wool wrapped around their left wrists, held in their left hands, or stuffed up the sleeves of their *dishdashas* (Z spin). After a length is spun it is wound around the staff, its end caught in the notch, and the process repeated.

Women usually spin in a sitting or crouching position. They rub the spindle against their right thigh with their right hand to start the spindles spinning to the left, again teasing out the wool with the right-hand fingers (S spin). The spinning of wool is a primary task for women but usually not for men. Men and boys are most often seen spinning when shepherding animals at pasture.

The fleece of one sheep spun into wool can be marketed for one dinar (ca. \$3.00). The single-ply spun thread is used for sewing, making thread covered boxes and decorative amulets, and for spinning into yarn.

Dyeing

When the spindle is full, the thread is wound from it around the left upper arm and hand to make a skein. When a number of such skeins have been prepared, the woman is ready to begin her dyeing. The primary dyers in each village are the one or two women who regularly weave carpets. Usually they dye a quantity of a single color when they run low on that particular hue. Most other women in the village will borrow or barter for the small amount of dyed wool they might need for small projects. Some women weavers prefer to wait until they have spun the thread into yarn before dyeing.

Preparations for dyeing are seldom elaborate. Pails or large vessels of the required number are set on mud supports over dung-paddy fires. Some women wash each skein in a warm solution of potash immediately before dyeing but most do not.

Today all dyes used in the area are industrial dyes, usually imported from Poland or Germany and purchased in the local market towns. Although vegetable dyes were once employed, informants claim that these were also purchased. If true, this probably accounts for the completeness and rapidity of the change to industrial dyes in this area.

The dyes are stirred into boiling water until fully dissolved, and the skein or skeins are then placed in the mixture on the end of a stick. Dyeing takes between five to ten minutes, during which time the wool is frequently stirred about and lifted from time to time on the end of a stick to judge the color. When the color satisfies the dyer, it is held over the pot on a stick until the excess moisture is drained. When nearly dry the skeins are rinsed in water, the running water of a canal is always preferred, and hung in the sun to dry thoroughly. All dyes used by the villagers are water-soluble, and they can be classified in two categories:

Powder Dyes

- Lemon yellow (cadmium lemon)
- Orange red (geranium red)
- Deep red (carmine)
- Pink (cobalt violet)
- Green (monastral green)

Crystal Dyes

- Deep violet (mauve)
- Deep blue (monastral blue)

White, brown and black can all be obtained from the natural colors of the wool, but sometimes wool is dyed black by mixing several of the above dyes together. It is usually nearly impossible to match exactly a color from a previous dyeing. In the shops where the dyes are sold, all colors are measured out with the same implement, introducing particles of alien dyes into each.

Thread or yarn covered boxes: (*şufat*, pl. *şfat*)

These boxes, usually kept concealed in the bedclothes, are used for all kinds of valuables, but especially for money. They are constructed in the same fashion as baskets made of wrapped reed or rush. Pliable strips of reed or rush are prepared by pounding them with heavy sticks and soaking them in water at the edge of the marsh, usually for a day or two. The reed or rush, when properly prepared, is easily bent to any shape required. The framework of the box and its top are built up like coil-made pottery. The section of reed or rush which will occupy the center is thoroughly wound with thread until completely covered. It is then bent double, and the portion now lying next to the central spine is likewise wound, a needle being used to insert the thread of the new wrapping through the wrapping of the previous section. The process continues as the reed or rush is coiled around the core and wound and bound with thread. The angle of the sidewall as it joins the base for such boxes is usually perpendicular, but any angle can be constructed using this method.

The decoration of these boxes is accomplished through the skilful use of colored threads. Then the initial application of a decorative color occurs, the middle of a long thread of proper hue is tied to the reed and wound around it for the distance required by the pattern. The ends of the cord are left dangling until the next reed section is in place above it, at which time the colored thread is wound once more for the requisite distance and the ends left dangling once again. This process is repeated until the pattern is completed, at which point the thread is caught and tied off on the interior of the box.

Decorative Amulets (*dillā'a*, pl. *dillā'āt*)

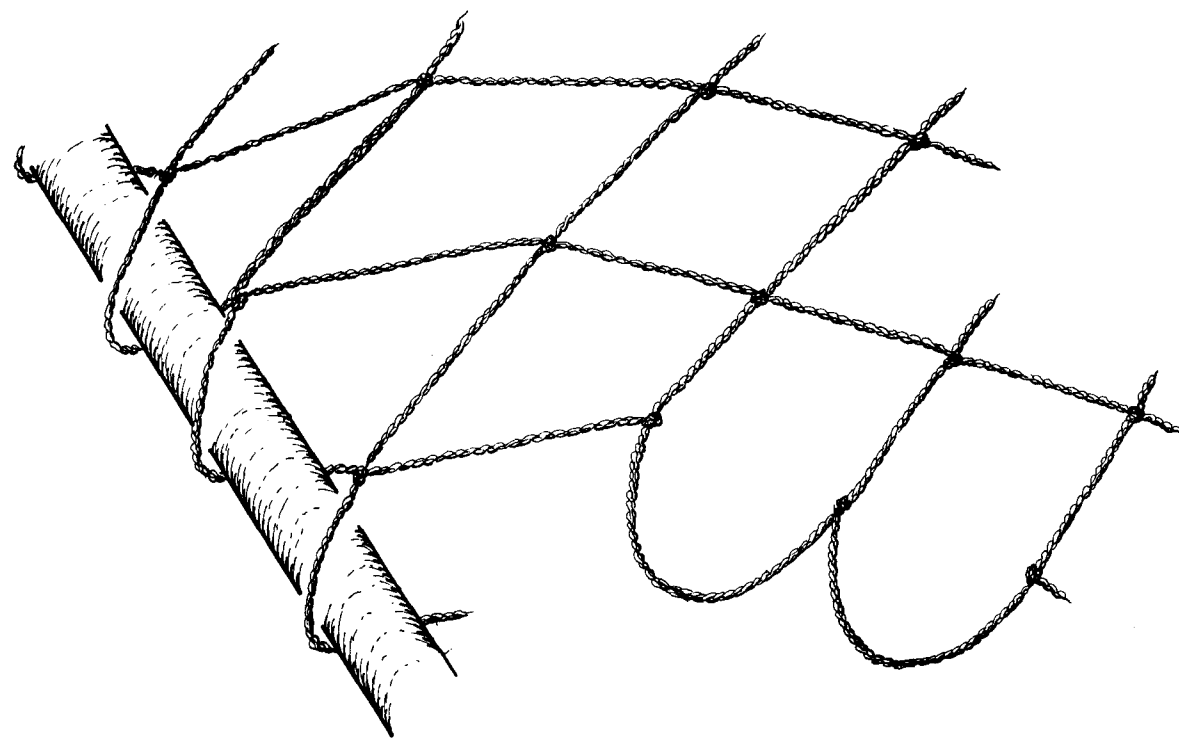
These are used partially for decoration and partially to avert the evil eye. They are simply made by wrapping thread around a frame of crossed reed sticks. Their often pleasing effect is the result of carefully chosen color combinations.

Twisting thread into yarn

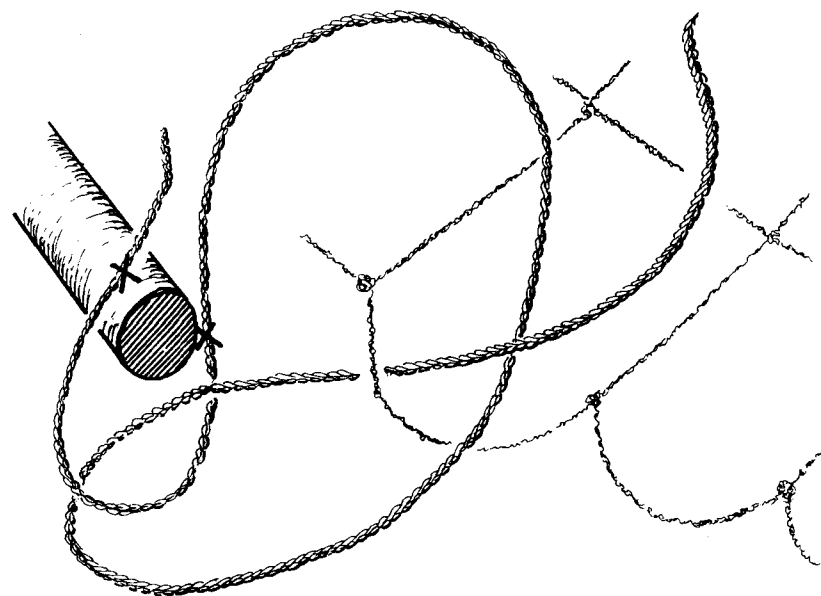
Except in special cases such as the preparing of thread for the making of a sling, for binding, tethering and carrying cords, and before the introduction of nylon string for the making of fish nets, all twisting of thread is done by women. Women use a much larger spindle (*mubram*, pl. *mabārim*) than that used for spinning thread. Although this large spindle is used in the same fashion as the small one, it is always used with the notched short end of the shaft at the top. Men make yarn from thread by attaching the center of a long thread to the side of their dwelling, a stake, or whatever is convenient. Holding the two ends under tension with the thumb and forefinger of the left hand, they rub the two threads lying against the left palm with an upward movement of the right palm until the thread is thoroughly twisted.

Sling (*ma'čāl*, pl. *ma'āčil*)

Three four-ply cords of suitable length are wrapped into small egg-shaped balls for easy use. The warp (*sida*) for the sling is made by wrapping a length of cord five times around one finger of



a.



b.

Fig. 1 Net-making

the left hand and a toe, the two of which are about 25 cm. apart, leaving a long loose end near the finger. This loose end is tied tightly around the cords beneath the holding finger, and the resulting eye around the finger is lined with half-hitches of the binding cord. The long cord, now firmly attached to the eye, is tied to the weaver's belt or a rope around his waist with a slip knot which makes it easier for him to increase or decrease tension on the warp. A round reed stick of small diameter is then inserted through a loop made in each of the ten cords. The stick keeps the warp cords firmly separated and is pushed down towards the toe as the upper sections of the weft (*lahma*) are finished. When the weaving is completed, an eye is made of the strands around the toe in the same fashion as that previously made around the finger. A length of four-ply cord is tied to each end of the spoon-shaped sling. That at the elongated end is fitted with a slip knot which holds it to the little finger during the throwing process, while that at the bowl-shaped end is held in the palm of the hand and released at the proper moment to send the sling shot on its trajectory.

The most common sling shot is made of small egg-shaped balls of mud dried in the sun, but small stones, when available, and pot sherds can also be used. The sling is used by both boys and girls primarily for edible birds but occasionally for small animals as well.

Fish and bird nets (see Fig. 1)

According to informants, nets used to be made of tightly-spun, two-ply yarn, preferably made of long goat hair purchased from the Bedouin. Now the villagers use exclusively the stronger nylon cord which can be bought in most market towns. The process of making nets, whether from yarn or cord, remains the same. The raw material is wound tightly around the central portion of a wooden implement (*māshia*) which has narrow openings at each end of sufficient width to allow the passage of a single strand of cord. The net is formed by passing the *māshia* around a fairly thick section of reed (*bakra*), which is held in the left hand, and the cord from a previously made section of net as indicated in Fig. 1 b. Tension is maintained by first wrapping one end of the string, and later the woven portion of the net around the big toe of the right foot.

Two types of fish net are regularly made and used in the area, an oblong net, the largest nearly 30 meters in length, and a circular net. The oblong net is used in three ways. As a set-net, sometimes with two nets tied together on their short sides, it is staked out in the marshes with reed or bamboo poles. Fish enmesh themselves of their own accord or are driven into it by the fisherman who moves his boat towards the net from several hundred feet away smacking the surface of the water with his pole, beating metal pots, and uttering loud cries. They are also used as seine nets by several fishermen working together to sweep an area of special promise either in an arc towards the shore, or in an ever tightening circle in deeper water. Sometimes they are used as drift nets in the canal with their lower edge weighted and their upper edge attached to the sides of boats.

Using such large nets as these is usually a group effort of one or more families of commercial fishermen from among the Beni Hassan. The fish caught are sold to *suffat* or fish buyers who maintain market places at points where a road comes close to the edge of the marsh or a canal. The fish buyers usually salt the fish and ship them to Basra or Baghdad.

Throw type fish nets are circular and are attached to a metal ring, which is approximately 12 to 14 cm. in diameter, at the center. The outer edges are lined with iron or lead. Ten lines a little longer than the radius of the net are cut and tied at the top to form an eye. The net is flattened on the ground, and the eye of the ten lines is secured around a stake driven into the ground in the

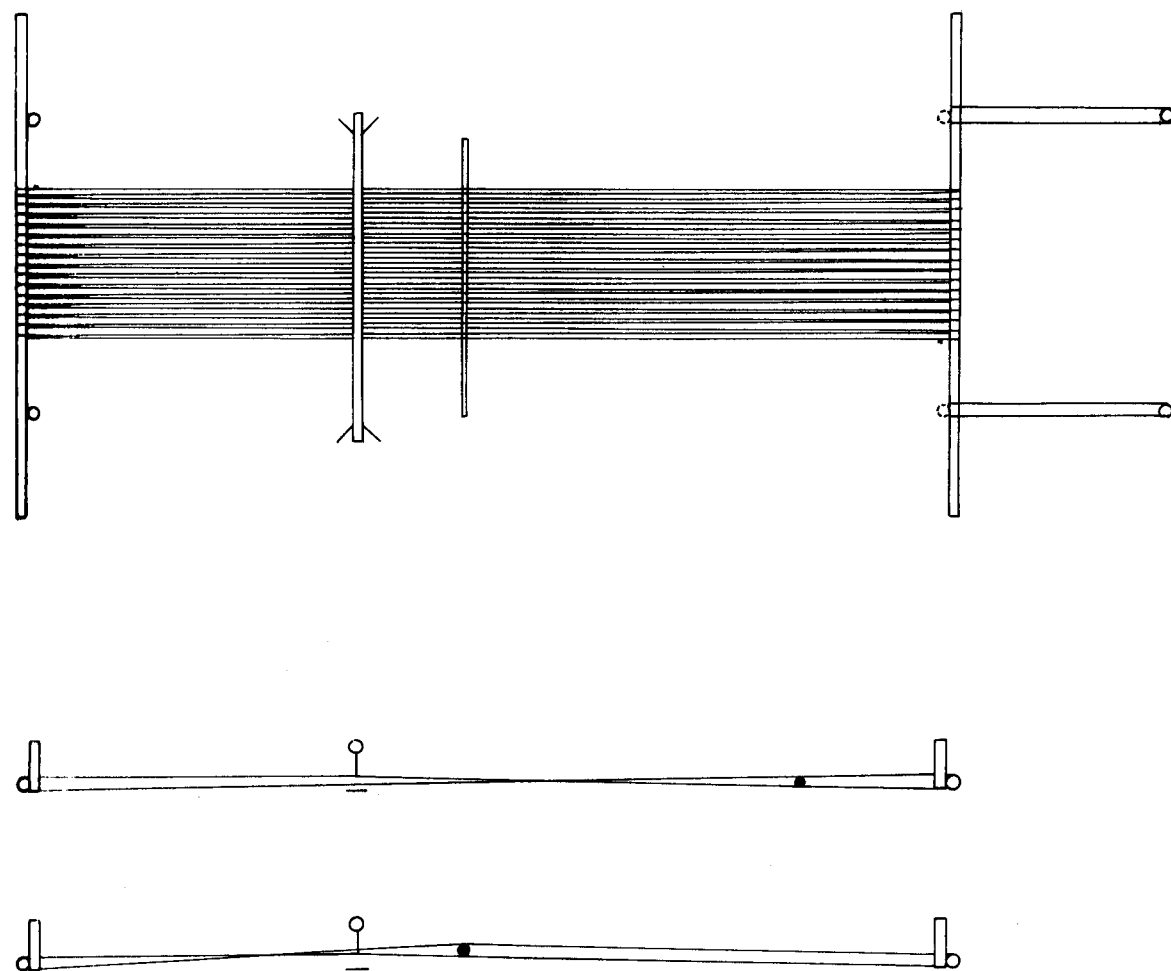


Fig. 2 Carpet loom (Scale 1:6 of the model)

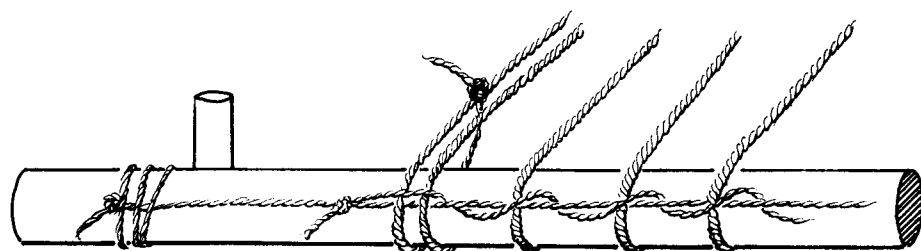


Fig. 3 Warp beam (NB 'Top' threads only shown in warp)

center of the metal ring. The lines are then spread an equal distance apart and attached to the bottom of the net. Two subsidiary cords are attached to the middle of each main line and also to the circumference of the net, one on either side of the line to which they are attached and one-third of the distance between it and the neighboring main line. The net is then turned inside out and a long cord attached to the eye at the top. When throwing the net, the caster grips one edge in his teeth and the balance of the net in his right hand with the long cord wound around his wrist from which it will unravel as the net flies through the air. Drawing in the cord brings the weighted bottom of the net together below the surface of the water ensnaring the fish between it and the more buoyant top. These nets are usually used on the shore of the canals by non-commercial fishermen to provide fish for home consumption. The fisherman always casts the net at specific fish he has spotted.

Until recently only the villagers used nets for fishing. The Midan speared fish from their boats or along the shore with trident shaped iron spears mounted on reed shafts (*fālah*, pl. *fālāt*), or poisoned them with datura secreted in shrimp or cut-up fish bait. Now, because of the price that fish are bringing and to the despair of their elders, the younger Midan are also netting fish.

Small clap nets for birds, usually no bigger than three meters by seven meters are sometimes set for water fowl in the shallow water at the edge of the marsh. A roughly oval trench is dug to conceal the folded net where the water is no more than two or three inches deep. A reed blind is built at one end with two holes, one from which the hunter watches, the other for the pull rope. Grain is regularly scattered in the trapping area for a few days to accustom the birds to feeding there. On the appointed day the hunter again spreads grain early in the morning and hides behind the blind until as many birds as possible are in the netting area. He then pulls the cord. A skillful hunter can capture twenty to thirty ducks at one time. Although people in the area relish wild duck, they never eat tame ducks for they consider them unclean.

CARPET WEAVING

Setting up the loom and warping (Fig. 2)

Ground looms used by women are the only looms seen in the villages. The wooden components of this loom are: a breast beam and a warp beam (each known as a *misdat*, pl. *misādi*), a heddle rod (*nira*, pl. *nirat*), a shed stick (*haffa*, pl. *haffat*), and several sturdy stakes (*watad*, pl. *awtād*). When the loom is to be used for the time consuming task of making carpets, it is almost always set up in a separate reed structure to protect the weaving from inclement weather and provide shade on hot sunny days. The ground is covered with one or more reed mats.

The breast and warp beams are set at an appropriate distance apart behind stakes. Each has a cord made of four to six ply yarn stretched along its length and tied tightly at both ends, and another lighter length of cord tied at the right hand side only. The latter will be used to hold each warp in its proper place by tying the warp to the stretched cord on the beam with a half-hitch.

Warp cords at the outer edges are made especially thick, usually of eight-ply yarn and are called *minīna* (pl. *manaiān*). Warping begins with the tying of such a *minīna* around the right-hand side of the breast beam and fastening it in place with a half-hitch of the breast beam cord (Fig. 3). The *minīna* is then passed under the warp beam, cut, knotted to a warp cord of regular size (usually two to four-ply) and fixed in place with a half-hitch of the warp beam cord.

The warp is passed back and forth around the two beams, first under, then over each, and held in place with half-hitches of the beam cords, until the required number for the width desired have been laid out. The last warp thread, again a *minīna* of special thickness, is pulled tight to insure equal tension on all the warp and tied around the warp beam with a slip knot. This will provide a means of adjusting the tension of the warp, especially of individual cords should one be broken or eaten through by a mouse, which is an all too common occurrence. Several makers use a double *minīna* on each side of the rug to give it additional strength. Two stakes are now set about two or three feet below the warp beam and are attached to it by means of ropes bound tightly to the beam, wrapped around the stakes and tied to the beam once more with slip knots. The stakes which previously held the warp beam in place are now removed. This new arrangement permits the increasing or decreasing of tension on all the warp cords simultaneously.

The warp cords now describe an ellipse crossing near the center of the loom. A shed stick is inserted through the loop at the foot of the loom, and a heddle rod attached to the alternate warp threads raised at the head of the loom by means of a continuous yarn leash. Both the shed stick and heddle rod are movable. The heddle rod is moved toward the bottom of the loom as the section above it is finished. The shed stick is moved towards the heddle rod in order to depress the set of cords tied to the heddle rod and raise those which are unattached.

If the edges are to be bound, almost always with pile carpets and occasionally with flat woven carpets and pillows, a stake is set on each side of the warp to which the binding cords (*khait laff*, pl. *khiyūt laff*) are tied in order to maintain their tenseness. These binding cords are usually made of six to eight-ply of varicolored strands.

Weavers

The larger products of such looms, pile or flat woven carpets, are made regularly by only one or two women in each village because of their acknowledged skill. Other villagers desiring such a carpet will either furnish the wool and pay the weaver for her time (ca. two and a half dinars), or purchase it outright for cash or barter. Because of her skill, the weaver is a decided economic asset to any household. Her community-wide status which is greater than that of the ordinary woman is in part due to the money she brings into the household, in part to the fact that she is an important buyer of wool in the village, and in part to the fact that most women and some men and boys in the village are in debt to her for the loan of small quantities of dyed wool or dye, the loan of her dyeing vessels, or the repair of their household carpets. Then too, most households would prefer to have her good will, for when they can afford a new carpet they will probably buy it from her. The number and quality of the carpets that a villager can display over his reed mats in the public reception area of his families compound on feast days in an important status symbol. Although it is possible to buy a carpet from a neighboring village, this is seldom done. Just how highly a village weaver is regarded is best indicated by the fact that the decision as to whether the weaver could be photographed or even watched at her work was usually made by the weaver, while in other crafts it was always made by the women's husbands or eldest sons.

Women weavers wield considerable influence in their individual villages on the moral fabric of village life. Her methods are simple. When a neighbor wishes to sell wool, buy a carpet or borrow goods or supplies, she will readily agree to the transaction with those who have behaved according to traditional morality. She will also probably agree to the transaction with those who have behaved improperly, but not without first publicly calling their transgressions to their attention. A similar mechanism for promoting village cohesiveness was noted in the distribution

of small quantities of bitumen by itinerant boat repairmen last year (Wood Boats and Bitumen). The main difference between the two approaches is that women weavers concern themselves with a person's family responsibilities as well as his or her community responsibilities.

The two major markets for the weaver's carpets are the people in her own village or those in the nearby Bedouin encampments. One can also sell them in the Suq at Shatra, but this involves a long trip both ways. Sales in Shatra are most often to rug dealers who ship them to Hai which is the center for village carpet trade in South Iraq. There is also a good market for used carpets there, but both villagers and Bedouin shun them. There is a fear that they may be buying the possessions of someone who died.

Within the village one can barter the carpet for wool, staples, livestock, products of other crafts, etc., or sell them for cash. In the Bedouin encampments one can also sell the carpet for cash or barter it, most usually for woven goods. Bedouin women who visit this area use ground looms similar to those of the village women for making tent panels, and traditional tent dividers of bands of camel, goat or sheep hair (*'idil*, pl. *'idūl*). None of these, of course, are of particular interest to village women. Most of the groups who visit the area, however, have at least one family of weavers whose men folk weave cloth, blankets and sacks and bags of various shapes and sizes on horizontal treadle looms. Some of the village craftswomen barter their carpets for this Bedouin cloth which is used for making clothing or for blankets which they or members of their family will embroider. Like the craftswomen, the Bedouin can barter his woven goods for things needed in the villages or sell them for cash either in the villages or a near-by market town. Male weavers are held in ill repute by both villagers and Bedouin and members of his family can only marry members of another weaving family. So sedentary an occupation is clearly at odds with the image of an ideal man in both village and Bedouin communities.

Village weavers of carpets sometimes have one or two assistants who help them with the work and in this way learn the craft. Usually these women belong to the same household as the weaver, but sometimes they are her married daughters. Often to pass the time away while weaving, the women sing songs. Like songs associated with other crafts and occupations in the area, these tend to glamorize the particular craft and extol hard and careful work. It is not possible to overemphasize the contribution of these work songs to village life for they play a most significant role in building and reinforcing the work ethic of the community.

Flat woven rugs (*bsāt*, pl. *bisīt*)

The warp (*sudda*), aside from the *manaiān*, and the woof (*daggāg*) consist of two-ply yarn. The weaver or weavers sit on their haunches atop the portion already woven at the breast beam end. They form the counter shed by moving the shed stick towards them, and reaching over the heddle to pull the warp threads apart by hand. The shed is made by pushing the shed stick away from them and again pushing and pulling the warp with their hands. It is important to note that the heddle rod is never raised and lowered, it is moved only in the direction of the warp beam as the section above it is completed. The wool, previously wound tightly in egg-shaped balls, is passed between the warp threads by pushing and pulling, and pressed against the previously woven portion with a shaped reed stick (*khlal*). After two courses of wool are woven in this manner, they are beaten against the finished portion with an implement consisting of several iron teeth mounted on a wooden handle with bitumen (*mudhrab*). The wool is always passed around the outer *manaiān*.

The often elaborate decoration of these carpets is produced through the use of different colors in the wool. Wool of the appropriate color is woven into the particular warp cord at which it begins and for the distance required by the pattern. It is passed around the terminal warp and left dangling, while the weaver continues with another color. The weaver returns to each color needed and uses it in the next woof course. This process continues until the particular color of cord is knotted, cut, and the remainder laid aside until it is needed once more.

Among the fifteen weavers studied, it would seem that the average width of such a carpet is about 80 cm. but can vary from 70 to 100 cm., while the average length is about 3 m. but varies from 2 m. to 4 m. It should be emphasized, however, that the unit of measurement employed in the making, buying and selling of carpets is the hand span (*shibir*, pl. *ashbār*) for width, and the length of the forearm (*dhra'*, pl. *adhru'*) for length. It takes a single weaver from 15 to 20 days to make such a carpet out of the wool of 4 to 9 sheep. The completed carpet is judged by prospective buyers on the basis of the appeal of its decoration, and the closeness of the weaving which indicates both the skill of the weaver and the amount of wool the carpet contains. The latter judgement is made by holding the carpet over one's head to see if the light of the sun can penetrate between the wool. Cost of the new products ranges from 6 dinars to about 12 dinars depending on size and quality.

Pile Carpets (*sijāda*, pl. *sijādāt*)

Pile carpets are made by the same women weavers in the same general sizes as the flat-woven carpets. Both ends of such a carpet are made in flat-woven style for a length of about 30 cm. The pile consists of two-ply yarn cut in appropriate lengths, and the shorter the strands, the cheaper the rug. Strands are cut on a grooved wood or reed stick of appropriate diameter (*maḥsaja*, pl. *maḥāsaj*). The yarn is wrapped around the stick, and a knife blade run down the groove cuts several strands at once. As long as her stick is in good condition, the pile of a weaver's carpets is fairly uniform. The design in the pile section comes of course from the use of various colored threads knotted to the warp, but the woof is almost always also dyed wool, usually of a single color and in the majority of cases the color chosen is orange. Four to six rows of woof are woven, with each two courses beaten in as is the woof of the flat woven carpets. Then a row of strands for pile are added. Each is tied with a ghordies knot to two adjacent warp threads, one from the shed and one from the counter shed, and these in turn are beaten tight. At the conclusion of each such cycle, binding cords (*khait laff*, pl. *khiyūt laff*) consisting of two or three strands of two-ply cord (most often one of green and one or two of orange) are wrapped around the outer *manīna* and adjacent warp cord on each side of the carpet. These are pulled tight and tied under tension to stakes driven into the ground, one on each side of the loom.

It takes one woman 20 to 25 days to complete a *sijāda*. She markets them in the same fashion as flat woven carpets, but since they require more wool (from 6 to 12 fleeces) and more effort, she sells them for from 8 to 16 dinars.

Combination carpets (*shirpesha*, pl. *sharābish*)

These are essentially flat-woven, but with several squares (from 30 by 30 to 40 by 40 cm.) or oblongs (from 30 by 40 to 40 by 50 cm.) of pile woven in a line down the center. They are rarer than the flat-woven carpets or the *sijāda* and sell for 10 to 18 dinars.

Other weaving

Women who make carpets can also make pillow covers, small sacks, small money purses and

belts or straps from time to time, but so do most other women in each village working on looms smaller than those required for carpets. In the construction of these smaller looms reed is frequently substituted for all or some of the wooden parts of the more massive carpet loom. Although these can be made in any of the carpet techniques, the flat-woven products are considerably more popular. Needless to say, the quality of workmanship and attractiveness of design varies more widely in these products than in the carpets.

Embroidered blankets

Blankets purchased from the Bedouin or in the nearby market towns are elaborately embroidered by young girls for their marriage beds and sometimes by mothers for their sons. The most common examples are comparatively lightly embroidered, but those most prized are heavily embroidered over their entire surface with a multitude of colorful patterns. Although, according to informants, the sale of these blankets is a relatively recent phenomenon, the best embroiderers have always occupied a position of respect within the community second only to the rug weavers. This is especially interesting when one considers that at least a part of the carpet weaver's status is the result of her economic contribution to the family. The price of these blankets varies widely from 6 to 18 dinars depending on the quality of workmanship.

Design

Right angles dominate in the repertoire of stylized geometric designs currently in use in the area although the lines are often slightly curved and the angles slightly skewed. All weavers agree that the major part of these designs are abstract adaptations from environmental subjects such as the frog, scorpion, date palm, dome or minaret. This seemed to offer the investigator an unique opportunity to explore the significance of design combinations. Although the weavers were most cooperative when asked what a design combination was or what it meant, our hopes proved illusory. Not only were the same designs interpreted differently by two weavers from nearby villages, unless they were clearly self-evident, but a single design was often assigned an entirely different significance by the same weaver if she was asked about it on two successive days. On the other hand, there would appear to be an ever increasing use of small, more or less realistic representations of men, women, animals, birds, flowers and mosques, whose meaning is as clear to the prospective buyer as to the maker. While geometric designs still seem to dominate on woven materials, the embroidered blankets are often especially inventive in combining the geometric and small figural in a wide variety of interesting ways.

Carpets are woven without drawn patterns of any kind. Each weaver keeps in her head the position and size of the patterns she wishes to appear on the finished work and weaves accordingly. Two carpets woven by the same weaver can display quite different arrangements of the basic elements.

ANCIENT WEAVERS

Some aspects of ancient production at al-Hiba can be inferred from the evidence recovered during the excavations.

Spinning thread

The spinning of fibers into thread is attested at al-Hiba by an abundance of spindle whorls of roughly hemispherical form and with flat bottoms. The fact that not all of these are in perfect balance would not impair their usefulness. From a study of modern whorls, which like the shafts are usually made of reed or wood, it is clear that minor imperfections in balance have very little effect on proper functioning. It is interesting to note that one modern spinner was observed using a blob of hand-formed, sun-dried mud for a whorl and that two were seen using E.D. terracotta chariot wheels picked up from the surface of the ancient mound.

Spinning of yarn

Spinning of yarn from thread in E.D. IIIB is attested by impressions of cord found on mud jar sealings. Microscopic examination of these impressions found at al-Hiba indicates that both two-ply and four-ply yarn of animal fibers were used. This opens the possibility of distinguishing two kinds of spindle whorls, a smaller and lighter one for spinning of thread and a larger and heavier one for spinning yarn. Such a size variation does exist among the roughly hemispherical, flat-bottomed whorls and it is possible that the larger variety of these were used for making yarn. On the other hand, among the terracotta donut-shaped objects from antiquity there are some of rather good balance and with genuinely circular openings which are considerably heavier and would have been even more suitable for this purpose.

Slings

The use of yarn for slings in antiquity is a reasonable possibility although they may also have been made of leather or woven grass. That E.D. IIIB people used slings is quite clear from the abundance of sun-dried mud sling-shot found in archaeological levels, the same kind of shot which is most often used by villagers today.

Fishing nets

Fishing nets similar to those used today were probably made of yarn in antiquity as they were formerly in the local villages, according to informants. Although nets can be set in shallow areas with little or no current by attaching them to reed poles, fishing in the canals would probably have required some kind of weights. A second class of donut-shaped terracotta objects seems most carelessly formed with little or no attention paid to the shape of the central openings. In contrast to those mentioned above which may have been used as whorls and whose central openings appear to have been made by inserting and twisting around reed or stick, the opening in these are made with the craftsman's fingers and are highly irregular as is the shape of the object itself. These may have served as sinkers.

The third class of these terracotta objects may also be related to fishing. They are considerably larger in diameter and have much larger central openings. Although somewhat smaller than the metal central rings used on modern throw-nets, experiments indicate that they are capable of performing well the same function.

Weaving

That weaving was practiced at al-Hiba in antiquity is attested by numerous impressions of fabric preserved on mud jar sealings and on copper objects from the votive deposit in Area B. Examination of these impressions indicates that the material was a simple two-ply weave of animal fibers which might have been made on any kind of loom. The absence of identifiable loom weights at al-Hiba would tend to rule out the use of warp-weighted looms on the site. Indeed, as Professor Richard Ellis points out in his unpublished study of the lexical sources collected by Armas Salonen, it is not possible to find a word that can be recognized as referring to a loom weight either among parts of the loom or among weights. Professor Ellis says that a word which should be translated "beam" when referring to looms is usually mentioned in texts from the late third and early second millennia in pairs, which suggests that a double beam loom is indicated. The sole pictorial representation of a loom from the Mesopotamian cultural area, an archaic seal impression from Susa dating to about 3000 B.C., shows two weavers at work on a horizontal, double-beam loom of the same type as that used in the modern villages near al-Hiba today. Next to the loom, on this seal, Professor Ellis has identified the representation of two vertical posts standing in supports as a warping frame and points out that such a frame is consistent with New Kingdom Egyptian practices in warping the vertical double-beam loom. He also calls attention to the use of the terms "upper beam" and "lower beam" in a lexical text of the first millennium which implies that the vertical double beam loom existed in that period. It is certainly possible that vertical double-beam looms were used in Early Dynastic times as well as horizontal ones, and also possible that a similar division of labor existed in antiquity as today with women weaving on horizontal looms, men on upright looms.

On the other hand, another possible explanation of this warping frame is worth noting. In one weaver's household visited during this project, a mother and two daughters were rushing to complete several pillow-cases before the rainy season began. Space in the weaving shelter was limited and only two pillow cases at a time could be woven on horizontal looms. The mother, who was the master weaver, supervised and helped her daughters on the two cases which were in different states of completion. When one was nearly finished she would drive two beams perpendicularly into the ground at one side of the enclosure and warp them. As soon as a pillowcase was finished it was removed and the warped frame set horizontally in the newly available space.

No evidence for the weaving of carpets has been discovered at al-Hiba but they may have existed. Impressions of reed mats are often found on E.D. IIIB floors and it is at least possible that in antiquity as at present reed mats were used for everyday, but were covered with some kind of woven animal fibre on special occasions. Garments in figural representations of the period are sometimes represented with a heaviness of texture and the fringed selvages characteristic of modern village made rugs.

WEAVERS NEAR AL-HIBA 1990

(Afterword - 20 Years Later)

Enormous changes have taken place in weaving crafts in the villages since the material for "Village Weavers" was first collected twenty years ago. A primary factor is the total absence of the Bedouin, who used to camp in the area during the fall and early winter. In the past a major part of the carpet weaver's output was traded to the Bedouin weavers for cloth suitable for making clothes, for blankets and for bags woven on horizontal treadle looms. Although there is still a market for carpets in the villages themselves, the village craftswomen, where they still exist, no longer have a near monopoly on this trade in their own villages. Draining of the marshes and the building of a network of dirt roads has made the trip to the nearby market towns of Shatra and Dawiya a matter of minutes rather than hours. In the past regular access was by means of a motor boat which went up the main canal in the early morning and came back in the late afternoon. As a result of this change a prospective carpet buyer can more easily shop for traditional carpets in the *suq* at very competitive prices. Mass produced, so-called "Egyptian" carpets of horizontal colored bands are also available at about one half the price of a traditional product.

It is no wonder then that among the villages previously studied only two carpet weavers exist today. Both are elderly women who learned the craft from their mothers and grandmothers. Neither has anything like the moral authority wielded by their predecessors and both have rather large stocks of unsold carpets (8 for one and 11 for the other) which they periodically take to the *suq*. There they sit with three or four other weavers from the area around Shatra bargaining with prospective customers. Both these ladies maintain the mainly geometrical patterns of the past, but some of the weavers found in the *suq* have ventured into very large, "realistic" figurative representations often depicting such scenes as a full length man and woman holding hands with a small figure of a child standing between them. Among certain purchasers this type of carpet is more saleable than the geometric designs.

The prices of both flat woven and pile carpets have increased dramatically and in 1990 cost from I.D. 90 to I.D. 150 depending on tightness of weave. They are still woven on the same kind of loom with one difference. The ropes tied to stakes and the warp beam which produced tension on the warp, and must therefore be constantly tightened, have either been replaced or augmented with metal turn screws.

Changes have also occurred in other products. The thread or yarn covered box has been replaced in most households by colorful tin boxes originally designed for biscuits or candies. Decorative amulets are still made, partly for use on significant occasions or for special events, and partly by children. The sling is still made, usually as a toy, out of old inner tubes rather than yarn. Nets for trapping fish and birds are now purchased ready made in the market towns. Though sometimes repaired in the villages, they are no longer ever made there. Pillow covers have been largely replaced by printed cottons or factory embroidered panels. Reused composition feed sacks, sometimes edged with yarn to reinforce the seams, have mostly replaced the large and colorful woven bags of the past. Small bags have been replaced by plastic or leather purses. Cloth belts and straps have seemingly entirely disappeared and been replaced by leather. Embroidered blankets are still made. The blankets themselves are usually purchased in the *suq* and are seldom of 100% wool. The designs, while pleasing and decorative, are seldom as densely applied as in the past.

PLATE I



1. Woman spinning wool into thread.



2. Man spinning wool into thread. Note that the spindle is notched on both ends so that it can be used by either a man or a woman.

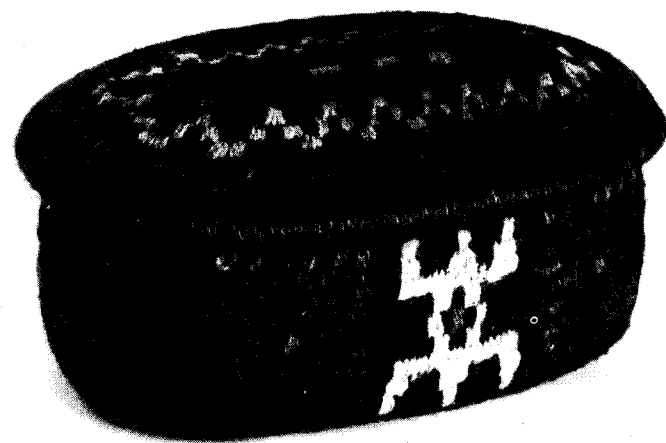


3. Woman spinning thread into yarn.



4. Woman dyeing skeins of yarn.

PLATE II



1. A yarn covered box.



2. A girl making amulets.

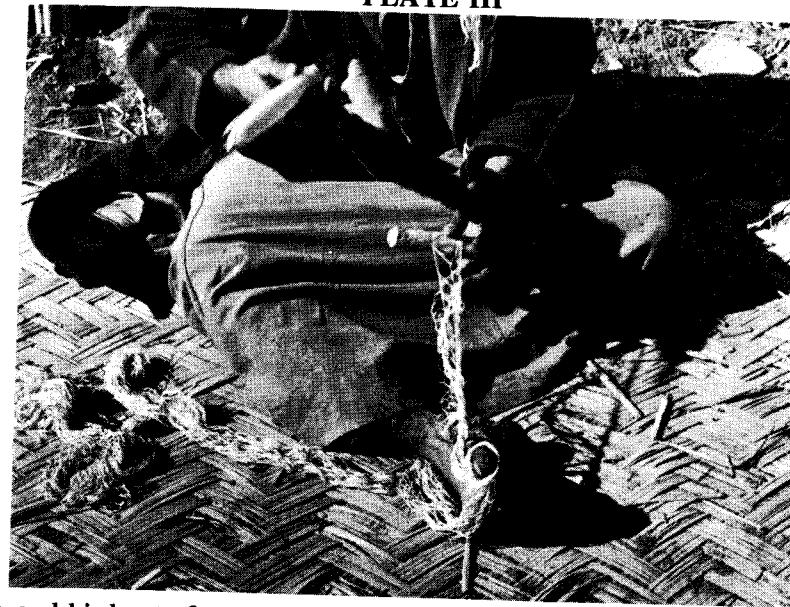


3. A boy making a sling.



4. The sling in use. Balls of sun-dried mud are used for shot.

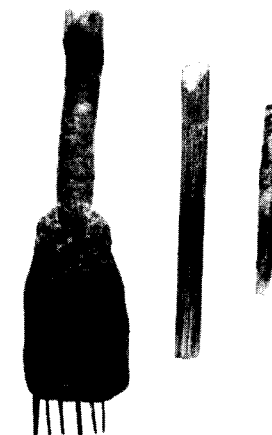
PLATE III



1. Making fish and bird nets from nylon string.



2. Using a throw net to fish in the canal.

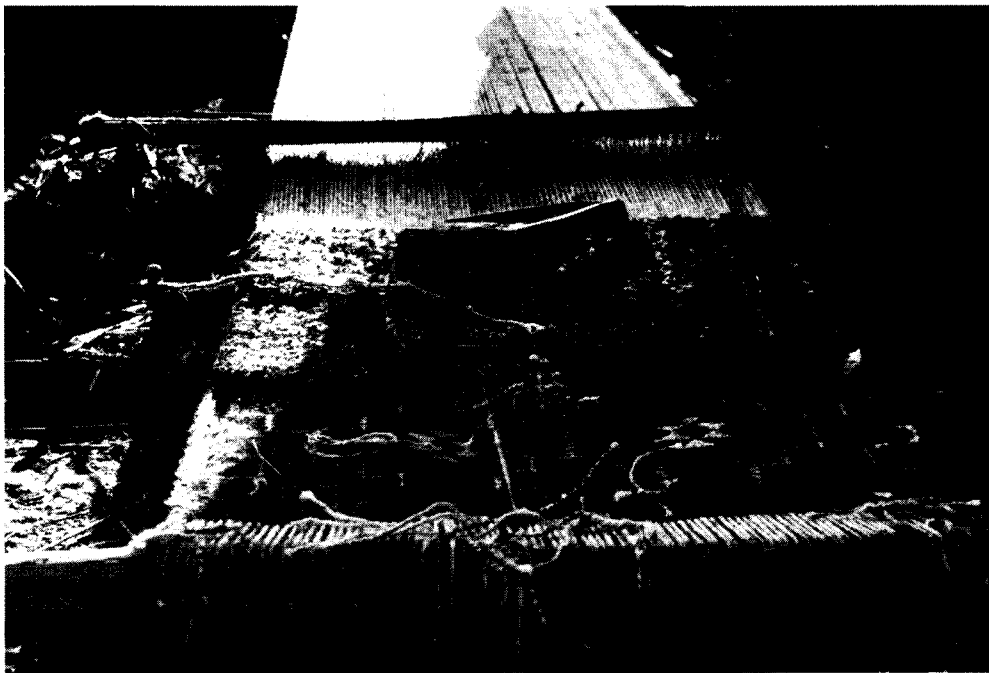


3. Carpet making tools. On the left a *khlal*, in the center a *mahsaja*, on the right a *mudhrab*.

PLATE IV

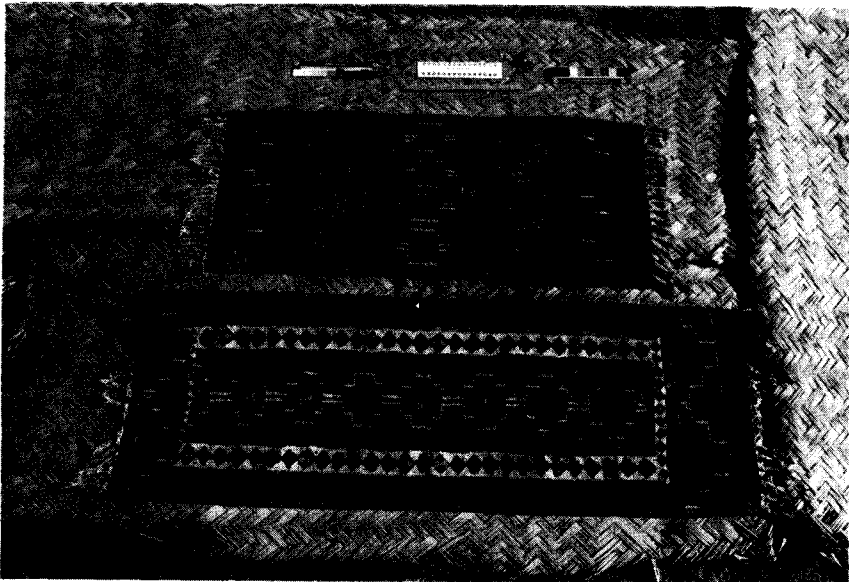


1. A carpet loom sheltered in a mud hut.

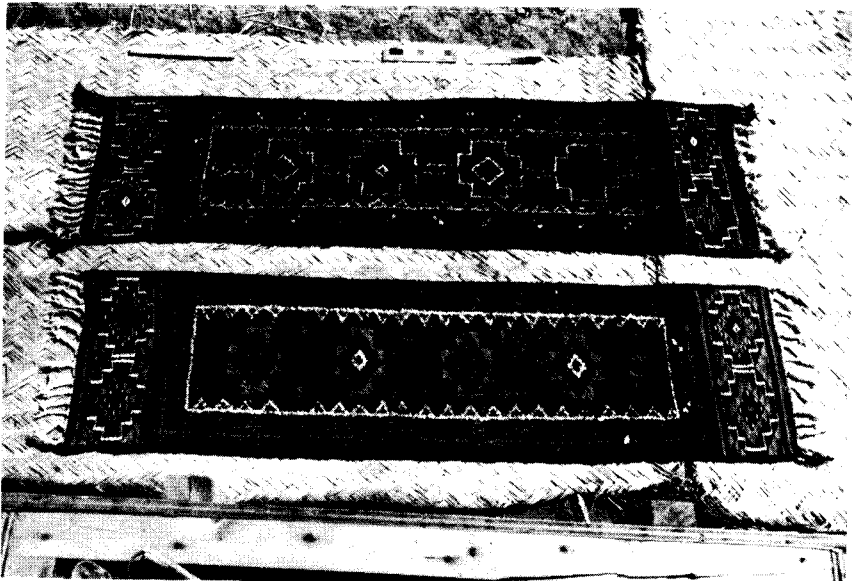


2. Head of carpet loom with weaving of pile carpet in progress.

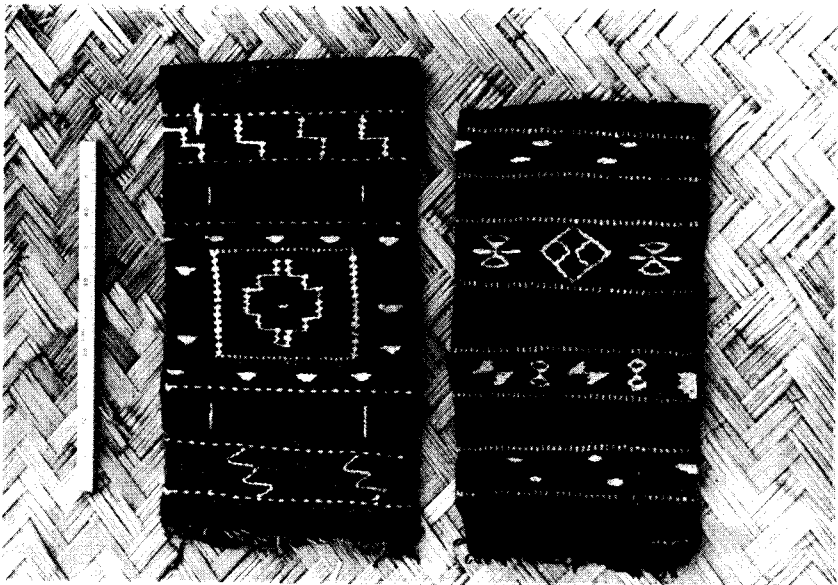
PLATE V



1. Samples of village flat-woven carpets.



2. Samples of village pile carpets.



3. Bags woven on smaller looms.

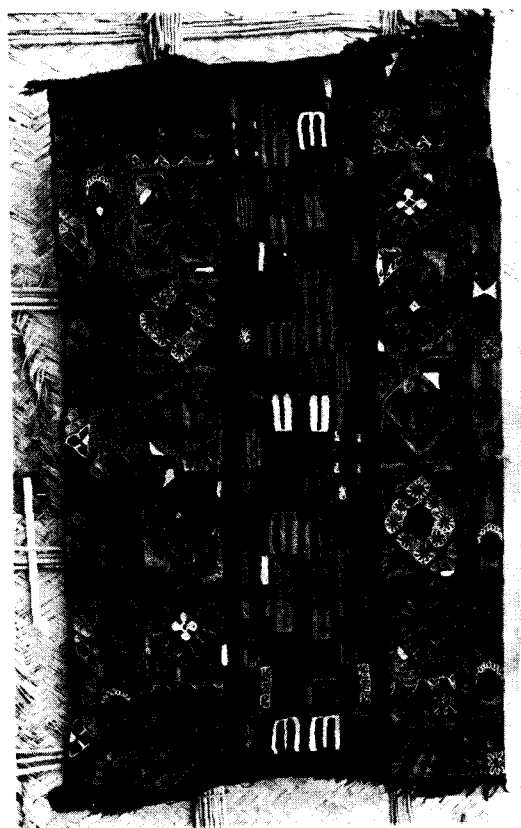
PLATE VI



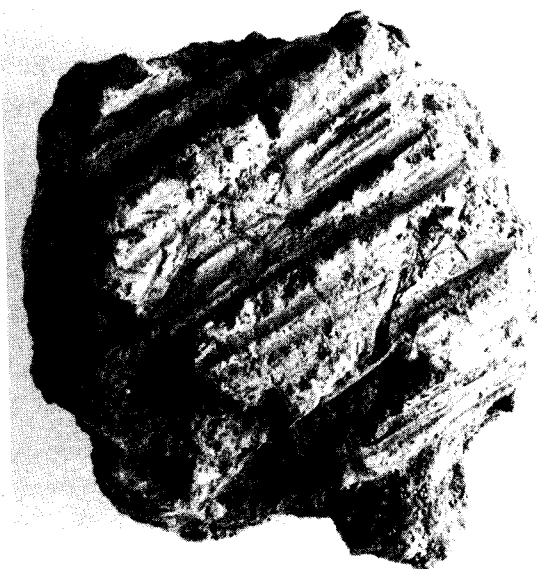
1. Belts which can be woven by either men or women.



2. Girl embroidering blanket.



3. Sample of embroidered blanket.



4. Impression of animal fiber cord or yarn on ED IIIB jar sealings at al-Hiba.

BANKING ON LIVESTOCK: INDIRECT STORAGE IN GREEK AGRICULTURE

Paul Halstead

(Sheffield University)

Flannery (1969, 87) has drawn attention to the possible importance of livestock in buffering prehistoric farmers in the Near East against the consequences of crop failure:

'One aspect of dry-farming . . . in the Near East . . . is that its outcome is unpredictable.' [In good years] 'a farmer . . . might even get a ten-fold yield', [in bad years the whole crop can be lost.] 'What early farmers needed, therefore, was a way of levelling the years of unpredictable bumper crops.' 'Primitive peoples . . . use three main methods for dealing with unpredictable surpluses. They can store them; they can convert them in to craft items of imperishable, exotic raw materials, which can be used as media of exchange during lean years; or they can convert them into live storage, i.e. domestic animals, which can be used either directly (as food) or for inter-group exchanges which set up reciprocal obligations and maximize sharing during lean years. These second two alternatives amount to a kind of "banking" of surpluses.'

This paper elaborates Flannery's argument in two ways: (1) by showing the great diversity of ways in which recent Greek farmers have used livestock as a vehicle for the banking or 'indirect storage' of temporary agricultural surpluses; (2) by pointing to the possible significance of such indirect storage in the redistributive economies of the bronze age Greek palaces.

Livestock as indirect storage in recent Greek agriculture

The primary mechanism used by recent Greek farmers to level out good and bad years was *direct* storage of surplus arable produce. Where possible, farmers typically aimed for some degree of overproduction and stored enough grain for two years' subsistence (Forbes 1982; 1989; Halstead and Jones 1989). In the longer term, however, the potential of direct storage was severely limited by the 'shelf life' of grain. Grain in long-term storage might well spoil before it was needed for human consumption, with the twin results that surplus might not be available when needed and that farmers might be discouraged from future overproduction.

To some extent, the problem of limited shelf life could be circumvented by selling surplus grain and so converting it to the more durable form of money, but small-scale farmers were often forced to sell surplus in times of general abundance and low grain prices - and to buy grain in times of general dearth and high prices. Moreover, money was also vulnerable during storage - to inflation, devaluation, theft and so on (Forbes 1989). Perhaps because of the limitations both of direct storage of grain and of indirect storage through the medium of money, recent arable farmers in Greece frequently sought to bank surplus through livestock.

Surplus could be *banked in livestock* in a number of different ways: (1) Grain (or money from the sale of grain) could be exchanged for livestock, allowing the farmer to build up a household herd (Halstead 1990). (2) A farmer with a large herd (or small household) could exchange grain for the services of a herdsman. (3) Surplus land and labour could be devoted to the growing of fodder crops, such as bitter vetch or grass pea. (4) Surplus food grains could be

fed to livestock. Substantial quantities of grain apparently earmarked for human consumption could be diverted to livestock in ways which might not be obvious either to the farmer or to the outside observer. First, in circumstances of plenty, crop cleaning might be suspended 'prematurely', and incompletely threshed cereal ears or partially winnowed cereal grains might be left with the straw, chaff and weed seeds as fodder. Secondly, the cultural boundary between food and fodder could be redefined in response to the success or failure of the harvest, with low-status food crops such as barley or rye being classified as fodder in good years (Halstead and Jones 1989; Halstead 1990). (5) In addition, spoiled stores and failed crops (as well as the by-products of crop processing) could be fed to livestock, so salvaging at least some of their value (Forbes 1982; Halstead 1990).

Farmers thus used surplus grain variously to establish, expand or improve the productivity of a household herd. Animals acquired in this way included dairy cows or goats, which provided milk for the household, and working oxen or equids, which enabled the farmer to expand arable production or to offer his services in ploughing or providing transport. Most arable farming households could only employ a limited number of work animals, however, and could only consume the produce of a few dairy animals. Household herds were traditionally dominated, therefore, by sheep and goats kept for a mixture of milk, meat, hides, wool and hair.

A household herd could enhance the economic security of the small-scale arable farmer in several ways. First, the use of additional work animals to expand arable farming reduced the risk of future *underproduction*. Secondly, animals slaughtered at Easter or for a wedding or christening played a part in cementing the relations of kinship or friendship which might prove critical in the event of economic hardship. Thirdly, the household herd could bring in cash from the sale of livestock, butter/cheese, wool, hair and hides or from the hiring out of work animals for ploughing and transport. Because demand for animal products was more elastic than that for grain, prices tended to be more stable in times of plenty. As a result, the household herd could be a more profitable and more reliable source of income for the small-scale arable farmer than direct sale of surplus grain. Fourthly, the household herd (particularly of sheep or goats) was explicitly perceived by some as 'animal capital', a reserve to be used in the event of need (Halstead 1990).

In the event of need, *surplus banked in livestock might be recouped* in a number of different ways: (1) Most simply, the household herd could be slaughtered and eaten - a rather wasteful use of 'animal capital' documented in Greece during the Second World War (Aschenbrenner 1972, 50; Halstead field notes). (2) More commonly, livestock was exchanged for grain (or sold to buy grain). Usually, more calories could be secured by such exchanges than by direct consumption of the animals. 'Surplus' sheep and goats were disposed of fairly readily by farmers in need, but *in extremis* work animals too were sold (e.g. Kiriazis 1931, 92-3). (3) An unsuccessful farmer might offer his labour (e.g. as a herdsman) in return for grain (Halstead and Jones 1989). (4)

After a poor harvest, a farmer might sell or exchange any stocks of high-status food grains such as wheat and subsist on low status grains such as barley (du Boulay 1974, 242; Halstead and Jones 1989). (5) In emergencies, farmers have been known to eat grain crops unambiguously classified as 'fodder' (such as bitter vetch), while crop processing by-products (such as bran, chaff or weeds) have also been used to 'stretch' grain supplies (Halstead 1990).

Recent Greek rural history strongly supports Flannery's argument for the importance of indirect storage through livestock in 'traditional' agriculture. For Greek farmers, banking on livestock made a vital contribution to the buffering of agricultural risk: farmers salvaged food which would otherwise have been wasted by feeding it to livestock; the banking of surplus in

livestock provided an incentive for the regular overproduction needed to cope with single crop failures; livestock provided a store of wealth which could be converted to food when household grain stores were exhausted; and fodder crops provided an abundant source of emergency food. Livestock were also of importance in providing the wool, goat hair and hides used to make fine craft goods (Flannery's principal alternative vehicle for the indirect storage of surplus) and specialisation in these handicrafts was often an essential complement to farming, particularly in marginal areas.

Recent risk-buffering behaviour in Greece has two further important implications. First, although farmers have tended to overproduce staple grain, to feed surplus grain to livestock and to use livestock as a reserve for consumption in times of need, few farmers rationalise their behaviour in these terms. Because overproduction and indirect storage were so thoroughly embedded in the culturally esteemed goal of owning livestock, overproduction was less likely to be abandoned after a run of good harvests (cf. Halstead and O'Shea 1989). This embedding also means that indirect storage in livestock may not be obvious to the observer (whence the widespread conviction that the feeding of grain to livestock is characteristic only of modern intensive stock-rearing - e.g. Palaima 1989) and that its recognition in the historical or archaeological record may be dependent more on circumstantial than on direct evidence. Secondly, while livestock greatly enhanced the flexibility of the arable farmer's risk-buffering armoury by facilitating the exchange of grain for labour, money etc., this same flexibility has enabled successful farmers to accumulate wealth and to perpetuate their advantage by acquiring rights to the labour and land of others (e.g. Halstead 1990; cf. also Vergopoulos 1975; Gallant 1991).

The present in the past: the relevance of recent indirect storage to antiquity

Prehistoric farmers in Greece were primarily dependent on the same or similar species of crops and livestock as their recent counterparts; some of the principal hazards to crop production which they faced (drought, frost, hail, etc.) will have been more or less the same; and the 'shelf-life' of grain in direct storage will similarly have been limited. They too will have had the opportunity to bank surplus grain in livestock and, by doing so, would significantly have enhanced their ability to survive occasional agricultural failures (cf. Halstead 1989a).

On the other hand, recent farmers have (to varying degrees) operated within the framework of an international market economy and, although neither money nor the market is a necessary prerequisite for banking surplus in livestock, some significant differences of emphasis may be anticipated between recent and prehistoric indirect storage. First, recent farmers have been able to derive a regular cash income from their 'animal capital' by selling dairy produce and calves, lambs etc. in the urban market or by hiring out their mules and oxen to carry goods between different towns. For prehistoric Greek farmers too there must have been opportunities to exchange animals and animal produce but, in the absence of an urban market, livestock was probably more important as a *store* than as a regular *source* of wealth.

Secondly, recent farmers have been integrated within a regular international trade in grain, so that surplus has usually been recouped from indirect storage by exchanging livestock (or the cash income from livestock) for grain rather than by eating livestock (significantly, the latter strategy is documented during the allied *blockade* of Greece in World War 2). In the absence of modern economic institutions and transport technology, prehistoric farmers will have had, at best, irregular access to grain from distant sources and so were presumably more dependent on eating (or

milking) their 'animal capital' to recoup surplus.

These suggested changes of emphasis in the operation of indirect storage have implications in turn for the way in which prehistoric farmers may have managed any 'animal capital'. Intensive dairying can produce more calories per head of stock than management for meat (Legge 1981) and, for recent farmers, the dairy strategy (with sale of the resulting offspring) was an effective means of banking surplus because cash earned in good years could be used to buy grain in bad years (e.g. Petsas and Saralis 1982, 277). Milk yields (and the survival of lactating females) are very vulnerable to many of the climatic extremes which afflict agricultural production (Haresign 1983), however, so that prehistoric farmers facing crop failure may not have been able to recoup surplus from livestock managed intensively for milk production. Thus prehistoric livestock used primarily for indirect storage should have been managed to favour the production of meat rather than milk.

Because *lean* meat is more or less useless as a famine food (Speth and Spielmann 1983), animals with a high fat content will have been most effective as a substitute for staple grains in times of shortage. Early literary accounts of feasting (e.g. *Odyssey* 8: 476; 18: 45) indicate that fat was highly prized in ancient Greece - as indeed was the case until very recently (e.g. Koster 1977, 225). Pork and mutton have a much higher fat content than goat meat or beef (Pellet and Shadarevian 1970; Dahl and Hjort 1976, 170-1, 204-5; Redding 1981, 152-60) and so pigs and/or sheep may be expected to have played a more dominant role in prehistoric than in recent indirect storage (cf. also Diener and Robkin 1978). (Cattle are more resilient to disease and poor nutrition than the smaller domesticates and for this reason are favoured as capital assets by many African pastoralists, but in emergencies they tend to be exchanged for grain rather than eaten [Dahl and Hjort 1976, 161-4].)

In the recent past, most male offspring of household herds tended to be slaughtered in infancy, partly to avoid competition for resources with valued lactating females and partly because of the high market value of tender young meat (Halstead field notes; cf. Payne 1973, 283 Fig. 2 [model kill-off pattern for milk production]; Koster 1977, 224-5); adult females were usually kept alive as long as they bred successfully and milked well, so as to take full advantage of animals of proven productivity (cf. Redding 1981, 308). If prehistoric pigs and sheep served as a 'bank' of meat for consumption in emergency, male animals should have been slaughtered as juveniles or adults, after they had achieved a reasonable meat weight. Although the rate of growth slows down markedly with the onset of adulthood, the meat weight of domestic animals continues to increase well into adulthood (e.g. Higham 1967, 93). So long as neither fodder nor labour was limiting, therefore, the potential of 'animal capital' to relieve food shortage would have been maximised by keeping both males and females alive into adulthood and by expanding the size of the herd. If crop failure did not necessitate earlier slaughter, elderly animals could have been culled as they lost condition and their meat could have been shared so as to create social obligations which might be exploited in time of need. If either fodder or herding labour was limiting, however, more meat could have been produced (and more social obligations created) by slaughtering most males and any females surplus to breeding requirements as juveniles or young adults (cf. Payne 1973, 282, Fig. 1 [model kill-off pattern for meat production]) and by culling breeding females in 'middle age', before their productivity declined (cf. Redding 1981, 308).

Age and sex composition also affects the *reliability* of 'animal capital'. Adults in the prime of life are less vulnerable to disease, starvation or predation than either juvenile or senile animals (e.g. Dahl and Hjort 1976, 115), so that a herd dominated by adults would have been far more

reliable 'animal capital' than a herd with a high proportion of juveniles (Ellis, Jennings and Swift 1979). Similarly, mature females of proven resilience are more reliable breeding stock than young females (MAFF 1956, 52; Redding 1981, 308), while non-breeding adults are less vulnerable to natural mortality than pregnant or lactating females. So long as neither fodder nor labour was limiting, therefore, the reliability of 'animal capital' would again have been maximised by keeping males and females alive into adulthood and by expanding the herd. If fodder or herding labour was limiting, the need for breeding females to replenish the herd would have had to be balanced against the reliability of non-breeding adults as a store of emergency food. The ability of the individual herd to reproduce itself is a vital concern to present-day pastoralists dependent on livestock for their livelihood (e.g. Dahl and Hjort 1976; Redding 1981). It may have been less critical, however, to prehistoric farmers using 'animal capital' for the indirect storage of temporary agricultural surpluses - particularly if such surpluses were commonly recouped by 'giving away' livestock.

While most African cattle pastoralists keep as many mature cows as possible, for milk production and reproduction, bullocks (i.e. castrated males) too are often kept into adulthood and particularly by successful households with large herds (Dahl and Hjort 1976, 29-33). At the same time, the limitations on herd size imposed by fodder and labour may be relaxed by keeping only a 'productive herd' of lactating females requiring close attention on the best and nearest pastures, while relegating dry females and bullocks to a 'fallow herd' on more distant and poorer pastures (Dahl and Hjort 1976, 135). The latter herd is 'fallow', in that dry cows are transferred to the productive herd as they become pregnant, and Greek shepherds frequently draw a similar distinction between lactating females ('*ta galária*'), requiring close attention and good pasture, and the dry or young females and breeding males ('*ta steíra*' or '*ta stérfa*'), which are less demanding (e.g. Campbell 1964, 23). The African 'fallow herd' also constitutes a 'reserve herd', however, in that the bullocks are kept to be sold or slaughtered in the event of shortage (Dahl and Hjort 1976, 161-7). A 'reserve flock' of sheep, with a high proportion of castrated adult males or wethers, would be very similar in demographic composition to the ideal wool flock (Payne 1973, 284 Fig. 3; Killen 1964).

Thus prehistoric livestock used for indirect storage should have been managed to favour the production of meat rather than milk, with an emphasis on juveniles or adults rather than on vulnerable infants, but the precise demographic composition of the herd would have depended on other constraints, including the frequency of exchange of livestock and the availability of fodder and herding labour.

Livestock as indirect storage in neolithic Greece

The contrasting patterns of agricultural dispersal in Europe and North America underline the importance of livestock to the early farming economies of the Old World. In North America, where crops were not accompanied by livestock, the initial spread of farming seems to have been conditioned by the availability of wild resources which could make up for deficiencies in crop production; in Europe this is not the case, perhaps because livestock fulfilled the same role (O'Shea 1989). The contribution of livestock to early agricultural subsistence, however, seems to have varied somewhat between different regions of Europe. In some agriculturally marginal parts of temperate Europe, where short growing seasons or poor soils were particularly inimical to early grain crops, there are indications that cattle at least were intensively managed for milk production (Legge 1981; 1989; Halstead 1989b). In these areas, livestock may have complemented grain

crops in making a major and regular contribution to subsistence.

In Greece, by contrast, livestock may have been more important as an alternative source of food in the event of crop failure. Neolithic faunal assemblages are strongly dominated by sheep or pigs (Halstead 1981; Trandalidou 1990), the carcasses of which tend to have a relatively high fat content, and slaughter is concentrated among juveniles and sub-adults rather than infants (Payne 1985; Halstead 1987), approximating to Payne's model kill-off pattern for meat production. As in the Near East (Flannery 1972), neolithic architecture in Greece emphasises the preeminence of the household as the basic unit of residence, production and consumption (Theochares 1973; 1980), but individual households will have lacked the manpower to maintain viable breeding populations of each species of domestic animal. The implication is that livestock were regularly exchanged between households and, perhaps less frequently, between different village communities (Halstead 1992a).

Thus there is circumstantial evidence that, in accordance with Flannery's model, neolithic Greek livestock was exchanged between households and offered farmers an alternative source of food in times of crop failure. Grain has recently been recognised in waterlogged stall-manure in neolithic Switzerland (Robinson and Rasmussen 1989) and in charred dung from bronze age Greece (see below). With growing awareness that the burning of dung as fuel has been a significant source of charred plant remains on archaeological sites (Bottema 1984; Miller 1984; Miller and Smart 1984; Moens and Wetterstrom 1988; Charles 1989), the feeding of grain to livestock may soon be documented for neolithic Greece too. Moreover, through examination of charred dung, it may be possible to determine whether some ('low-status') crops tended to be used as fodder and other ('high-status') crops to be reserved for human consumption (Miller 1984, 77).

Indirect storage in the palatial economies of late bronze age Greece

For late bronze age southern Greece, evidence for animal exploitation is greatly enhanced by written records detailing palatial interests in stock husbandry. These written records reveal an overwhelming palatial specialisation in sheep and, more particularly, in wool flocks consisting primarily of castrated male sheep or wethers (Killen 1963; 1964), while archaeozoological evidence from late bronze age northern Greece, and such as exists from non-palatial contexts in southern Greece, points to a more balanced mixture of livestock and more diversified exploitation of sheep (Halstead 1987; 1992b). The sheep flocks of the southern Greek palaces provided wool for a palatial textile industry (Killen 1984). To what extent could these sheep also have played a part in indirect storage?

The palaces seem to have acquired grain from two sources: wheat (whether free-threshing or glume wheat is unclear) was probably grown on palatial estates, while a range of other cereals and pulses was apparently acquired from non-palatial farmers by exchange (Halstead 1992b). The supply of grain from the first source will inevitably have been variable, and that from the second source perhaps likewise, whereas a substantial fraction of palatial ration payments seems to have been directed to full-time dependents (e.g. Hiller 1988) and so may have been fairly inelastic. In these circumstances of variability at least in the *supply* of grain, the palaces are likely to have had periodic grain surpluses (and perhaps also shortages).

Some grain issued to divinities or religious personnel (Palmer in press) might conceivably have been intended for the fattening of sacrificial animals, but there is no documentary evidence that surplus grain was fed to wool sheep. On the other hand, the palatial archives are primarily

concerned with monitoring the fulfilment of regular transactions (e.g. ration payments) and the existence of a surplus for banking in livestock will have been variable. Possible indirect evidence for the feeding of grain to sheep is provided by the very variable wool clip returns recorded at Knossos (cf. Killen 1984, 50 n. 3), which could *inter alia* result from significant differences between flocks in plane of nutrition (e.g. MAFF 1956, 49–50). In non-palatial northern Greece, there is more concrete evidence for a close connection between livestock and centralised grain storage at the late bronze age storage complex of Assiros Toumba, which contained piles of cereal straw (perhaps intended as fodder or byre litter) and traces of animal dung as well as a massive concentration of grain (Jones et al. 1986; Jones in prep.).

Palatial wool sheep were probably replaced on something like a 5–6 year cycle (Killen 1963, 87–8; Olivier 1967, 81–2) and flock replenishment was effected at the time of an annual census (Godart 1977, 36–8), when the palace at Knossos will have produced something like 10,000–12,000 retired wool sheep (Halstead 1993c). The fate of these sheep is not recorded, but their consumption by the palatial elite would have been a prodigious feat, suggesting that *inter alia* (e.g. slaughter for popular feasts) they could have been available for dispatching to local communities hit by crop failure. The condition of these sheep is also unknown, but records of fattened pigs and fattened oxen, probably as religious offerings (Palaima 1989, 104, 109), suggest that fat was prized and that the nutritional benefits of mutton would not have been spurned. To place this walking food bank in perspective, 10,000 sheep might have provided subsistence for something like 500 people for a year or for 1000 for 6 months (cf. Dahl and Hjort 1976, 220).

At least some of the male lambs needed to replenish the wool flocks presumably came from the breeding flocks also controlled by the palace, but surviving records of breeding flocks at Knossos only account for a fraction of the breeding ewes needed to replenish the wool flocks (cf. Killen 1964, 13 n. 63b). This discrepancy may simply reflect poor preservation of this particular group of records (cf. Olivier 1967, 80), or might indicate that a significant contribution to restocking the Knossian wool flocks was made from the non-palatial sector. In the latter case, these sheep do not seem to have been acquired by taxation, suggesting that they would instead have been acquired through exchange - perhaps for grain (Halstead 1993c; in press).

The 'shepherds' charged with looking after the palatial wool flocks may have been unusual among those working for the palace in receiving neither rations nor an allocation of land (Hiller 1988, 61). Moreover, the production targets set by the palaces in terms of wool and, where appropriate, lambs are sufficiently demanding that shepherds must frequently have had to make up shortfalls from their own resources (e.g. Killen 1963, 78). The annual census and reformation of flocks may also have been accompanied by significant changes in shepherding personnel (Killen, this volume). These shepherds may have been in temporary service, therefore, working off some debt to the central authority - possibly arising from palatial provision of subsistence relief during a period of economic hardship.

The wool from the palatial sheep flocks provided the raw material for a large-scale textile industry, employing both male specialists supported by grants of land and female specialists and work-groups more directly supported by the issuing of rations (Killen 1984; Hiller 1988). It is unclear on what basis either category of textile worker came to owe service to the palace, but the female work groups may have included 'depressed' members of society (cf. Killen 1979a), such as victims of household subsistence failure.

Whilst the palaces recorded the production and stockpiling of woollen textiles in some detail (e.g. Killen 1979b), they have left few clues as to their destination. Several kinds of cloth were

made, of varying quality, and it seems that a few were used as diplomatic gifts or awarded to senior palace officials (Killen 1985, 253–4, 263–4). The majority is unaccounted for but, by analogy with more durable palatial craft products such as jewelry, the less elaborate pieces may well have been quite widely distributed among individuals of fairly modest rank. Thus it is possible that the finished woollen textiles were, *inter alia*, exchanged for some of the cereals and pulses apparently acquired by the palaces from the non-palatial sector (Halstead 1992c).

It is suggested, therefore, that the late bronze age palaces of southern Greece were banking surplus grain in sheep, in human labour for herding and weaving, and in high-quality woollen textiles, and were using these woollen textiles in particular to secure further supplies of grain. Of course, indirect storage on the vast scale suggested for the palaces is rather different from the domestic initiatives taken recently by individual farming households. The implied transfers of sheep, grain, labour, and textiles between the palace and the non-palatial sector probably took place through the interlocking of centralised palatial banking with smaller-scale local or even domestic indirect storage.

The scope of local and domestic indirect storage will have been heavily circumscribed, however, by the extent of palatial surplus banking. The palaces consumed a large amount of surplus grain, human labour and perhaps livestock from the non-palatial sector, used up a large proportion of available regional pasture with their wool flocks (Chang and Koster 1986), and exercised an apparent monopoly over many or most forms of specialised craft production (e.g. Killen 1985: 252; Morpurgo Davies 1979). These constraints will have seriously weakened the capacity of local communities or individual households to buffer themselves against subsistence failure and strongly reinforce the circumstantial arguments for the existence of a palatial system of indirect storage.

Neolithic sheep tended to be killed as juveniles or subadults, perhaps because numbers were limited by the availability of pasture or herding labour or both. In that case, the culling of sheep before or on the threshold of adulthood implies increased meat production at the expense of the security of the livestock bank. On the other hand, there are architectural and artefactual hints that mutual assistance between households was critical to survival (Halstead 1989a) and hospitality involving the consumption of meat may have played an important part in maintaining such social obligations. Conversely, the apparent emphasis of the palatial flocks on adult sheep may indicate that, thanks to the ability of the palaces to secure labour services, herders were readily available and pasture consequently accessible. The size of the palatial wool flocks may primarily have been limited by the ability of the palaces to acquire young sheep from the non-palatial sector. The dependence on 'imported' replacement stock in turn partly accounts for the dominance of the palatial flocks by adult *males* and for their resemblance to the 'fallow herds' of African cattle pastoralists. This concentration on wethers is also closely related to the importance of textile production and exchange. Unlike the suggested reciprocal exchanges of sheep between neolithic households, however, emphasis on the exchange of woollen textiles manufactured in specialised workshops allowed the palaces monopolistic control of a major element in indirect storage.

The significance of palatial indirect storage

It has been argued that indirect storage lay at the heart of much of the palatial economy of late bronze age southern Greece. A similar interpretation may be widely, and in some cases more obviously, applicable to the redistributive economies of the bronze age Near East, where archival evidence is at times quite explicit on the feeding of grain to livestock (e.g. Maekawa 1983;

Postgate this volume; Morrison 1981, 275 n. 129; cf. also Brentjes 1963, 10 [on artistic evidence]), on the exchangeability of livestock for grain (e.g. Waetzoldt 1988), on the temporary or unrewarding nature of herding employment (e.g. Postgate 1975; Morrison 1981), and even on government provision of emergency grain rations in return for herding or harvesting labour (Postgate this volume). This analysis is of interest in exposing the important but often covert role of the palaces in providing a source of subsistence relief for farming households, but should not be taken as a denial that palatial economy was primarily geared to *mobilisation* for the benefit of the palace. On the contrary, the interaction between the palace and subordinate households served both to convert palatial grain surpluses into the alternative and more exchangeable forms of sheep or textiles and to create obligations of service to the palace.

The fact that this interaction simultaneously offered an immediate subsistence lifeline to needy households and a long-term means of trapping them into palatial service may also shed some light on a recurrent feature of ancient redistributive economies. As this volume underlines, livestock and textiles made from wool and hair occupy a preeminent place in many of the redistributive economies of the bronze age Near East, and the same was true of the Inca state (Murra 1980). Textiles of wool and hair have the twin advantages to these redistributive economies of allowing considerable specialisation in production, so facilitating the maintenance of a palatial monopoly (Killen 1984, 49 n. 1), and of being ready symbols of status and so highly desirable to their recipients. The same would hold for textiles made from plant fibres, however, and for metal, stone, glass, shell, ivory and ceramic ornaments, and these are of less universal importance. On the other hand, indirect storage creates opportunities for unequal accumulation of livestock, valuable craft goods (including woollen textiles) and human labour, and unequal rights to these resources lie at the heart of much palatial mobilisation. Indirect storage in livestock by farming households, therefore, may hold a key to understanding both the nature and origins of bronze age redistributive economies.

Postscript: Since completion of this paper, John Killen (in press) has drawn attention to a Linear B text at Knossos which *may* refer to the fattening of sheep on wheat

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SUBSISTENCE SECURITY AS A SELECTIVE PRESSURE FAVORING INCREASING CULTURAL COMPLEXITY

Richard W. Redding

(Ann Arbor/Paris)

The documentation and explanation of human subsistence behavior has become of increasing interest to archaeologists and anthropologists. For example, the origin of food production and the subsistence strategy of the earliest hominids are two problems that have generated numerous articles and books in the last two decades. These researches, as well as those associated with subsistence behavior in complex societies, have tended to lack a strong theoretical base and, hence, are, in general, not seen as central to explanations of the evolution of human behavior. In this article I will argue, based on ideas drawn from evolutionary biology, that a strong relationship obtains between human subsistence behavior and reproduction, and this relationship is the basis for a theoretical framework for articulating human subsistence behavior and the evolution of human behavior. This theoretical framework is applicable to all stages of human evolution but in this article I will focus on its role in modeling the evolution of cultural complexity.

This paper has four parts. The first is a brief statement of evolutionary assumptions, theories and concepts that underlie the theoretical framework that I will develop. The second sets out the theoretical framework for examining the relationship in humans between reproductive strategies and subsistence behavior and how this relationship might affect the evolution of human behavior. The third develops a model for the evolution of cultural complexity that is based on the theoretical framework. I will conclude with a brief examination of Near Eastern faunal data in the light of the model I develop. This last section is not designed to be a formal test but merely to illustrate the utility of one source of economic data.

An Evolutionary Approach

A series of concepts and theories drawn from Darwinian evolutionary theory have substantially influenced the theoretical framework that I develop in this article. These need to be briefly discussed and a general statement of the evolutionary approach I utilize made explicit. I do not wish to offer a long defense of the use of evolutionary theory or these concepts, but I do wish to make a few comments.

The basic assumptions I make are that selection operates on human behavior and it operates at the level of the individual. It is competition between individuals in an attempt to maximize fitness that yields behavioral diversity and behavioral change.

The literature on how selection might work in the evolution of human behavior and on what level it works is voluminous. A number of authors have detailed selectionist models for application to human behavior and discussed their utility (e.g.: Alexander 1979a, 1979b; Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1973, 1981; Cavalli-Sforza et al. 1988; Cronk 1991; Dawkins 1976; Dunnell 1980, 1990; Durham 1979, 1991, 1992; Flinn and Alexander 1982; Irons 1982; Leonard and Jones 1987; Richerson and Boyd 1989, 1992; Rindos 1980, 1984, 1985, 1986; Steklis and Walter 1991; Wilson 1978). Those familiar with this literature will realize that a diversity of opinion exists on how to model cultural change using a Darwinian paradigm. However, at this point, I suggest that determining which approach is correct is unimportant

because the disagreement is about the ontogeny of human behavior (see Alexander, 1979a, and Danbury, 1990). Everything that evolutionary biologists have learned they have learned without fully understanding the ontogenetic basis of any behavior in any organism. Further, in evolutionary biology the way to analyze ontogeny, fruitfully, all too often becomes clear only as a result of using evolutionary approaches. This will probably also be true of the application of evolutionary theory to human behavior.

I have recently run across the argument, generated in part by remarks by Rindos (1982, 1984), that evolutionary biologists frequently ignore intentionality in human behavior, or at least feel that it is unimportant. Most evolutionary biologists would have no problem with recognizing that behavior, human behavior in particular, may have a strong component of motivation and the variants produced would be acted on by natural selection. This is clear in Rindos (1984:86). What evolutionary biologists reject, and quite rightly, is the importance of intentionality as a source of information about the evolution of behavior. Rindos is quite correct in his statement that intent has no standing because it cannot be verified and is useless as an element in a scientific explanation. It is not that evolutionary biologists see intention as unimportant: it is simply irrelevant in explaining the evolution of behavior. How does one test whether a particular behavior arose by intention? More to the point; how does one differentiate (what predictions differ) between a model employing intentionality and a similar model ignoring it?

Two concepts that have had a strong influence on my work are inclusive fitness (and the related concept of kin selection) and reciprocity. The concept of inclusive fitness was developed by Hamilton (1964) to account for the appearance of phenotypic altruism. Hamilton recognized that natural selection should not only act to maximize genetic representation in future generations through one's own offspring but also through contributions to relatives with which it shares genetic material. Thus, fitness has two components. The first component is direct fitness, which is derived from one's offspring, and the second component is indirect fitness, which is derived from relatives with which the individual interacts. Individuals who use strategies/tactics that benefit their own offspring as well as their genetic relatives will have a higher fitness and these behaviors will have a positive selective value. According to inclusive fitness theory human behavior should have evolved to make us extremely effective nepotists (Alexander 1979a:46).

Although reciprocity is a concept that has been widely used by social scientists (Alexander 1979a: 49), it was first used in an evolutionary construct by Trivers (1971). Like inclusive fitness, reciprocity was also developed to explain the evolution of phenotypic altruism but it requires no assumption of genetic relatedness. Theory indicates that reciprocity will evolve when a behavior produces a return from the recipient such that the ultimate benefit is greater than the cost. Reciprocal behaviors have evolved between species but are more prevalent in social groups. The reliance by humans on barter and exchange would indicate that humans do engage in reciprocity on a scale not found in any other taxa.

The Theoretical Framework

The theoretical framework that will be articulated in this section is based on the theory of r and K selection, the theory of parental investment and concepts developed from the application of decision-making theory to human subsistence behavior. These theories and concepts need to be briefly explored before being synthesized.

r and K selection

The terms r and K are derived from the logistics model of population growth. This model describes population growth as the interaction of two independent parameters (see Wilson and Bossert, 1971, or any ecology text for a complete explanation). The first, r , is the intrinsic rate of increase. The value for r in any area is derived by subtracting the death rate from the birth rate. The second parameter, K , is the carrying capacity; it is area specific. K is the point on the logistic growth curve for an area and a taxon at which further increase in population is impossible because of environmental resistance.

The concept of r and K selection is derived from the two parameters in the logistics model. The concept was first developed by MacArthur and Wilson in the late 1960's, although it had been suggested 20 years earlier by Dobzhansky. The concept was widely applied until the late 1970's, when it fell out of favor, primarily because it had been misused (Redding 1986). r and K selection may be viewed as extreme strategies on a continuum rather than an either-or dichotomy (in fact the definition of a species as r or K selected is relative). At one end of the continuum are species with reproductive traits that favor production of a large number of offspring. These are r selectionists, so named because they maximize r . At the other end of the continuum are species with low birth and death rates. In these species population size tends to be close to carrying capacity and selection acts to increase competitive abilities of a smaller number of offspring. Species that use this strategy are designated K selectionists. Individuals using either strategy (or some strategy in between) are functioning to maximize their fitness: each is simply employing a different proximate approach to an ultimate end.

Relative to almost all other species, humans are extreme K selectionists. They possess almost all the character states that Pianka (1970) and Wilson (1975) have listed for a K selected species. In particular, humans tend to have lower mortality, longer life span, older age at first reproduction and fewer offspring. In the lists of characters developed by evolutionary biologists are three dealing with environments. The states in the three environmental characters for a K selectionist are: **more stable climate, more predictable resources, and a more stable habitat**. Yet humans have expanded into areas in which none of these states obtain.

Parental Investment

Relative to r selected taxa, K selected taxa frequently invest more in each offspring. K selected species frequently have well developed parental care behaviors and well integrated social groupings (Barash 1982:307). Humans invest heavily in each offspring. Humans have the longest gestation period, the longest infantile phase and the longest juvenile phase of any primate (Napier and Napier 1967). Parents usually care for offspring from conception until 14–16 years of age. Hence, raising an offspring to sexual maturity represents a considerable investment by the parents. As cumulative investment in an offspring increases with age, the parents should exhibit behaviors designed to reduce the risk of losing the investment.

Decision-making in Subsistence Behavior

The application of decision theory to human subsistence has resulted in some interesting insights that are pertinent to the discussion here. Coombs (1980) has examined subsistence systems that are characterized by environmental variability that can alter payoffs. Using decision theory he established two solutions as of major theoretical interest (Figure 1). The mini-max solution is the mix of subsistence tactics/strategies where the two minimum payoff functions intersect; hence,

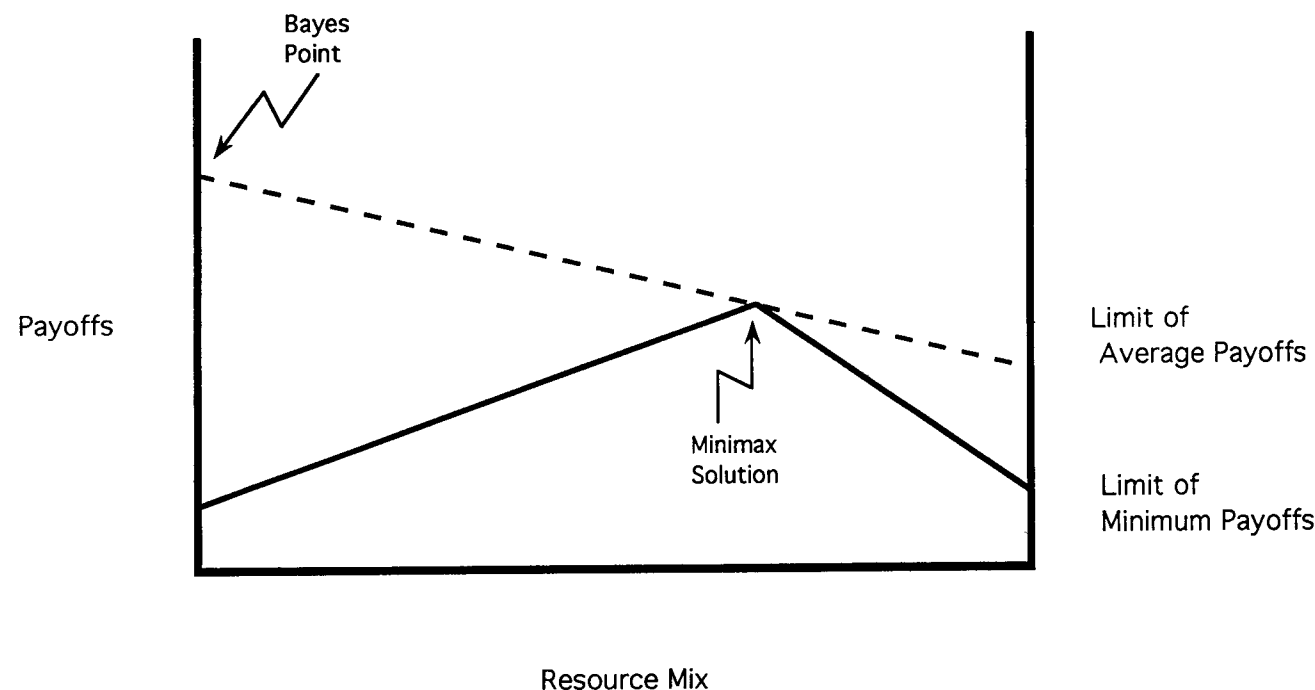


Fig. 1. Model of potential solutions in structuring the diet

minimum payoffs are maximized. The Bayes solution is the mix of subsistence tactics/strategies on the average payoff function (which is the average of the two minimum payoff functions) that maximizes this function. Coombs (1980:201) has argued that until perennial storage capabilities are developed, average payoff are not relevant since an individual cannot capitalize on past surpluses. With the development of perennial storage capabilities the Bayes solution becomes the single optimal strategy.

A Synthesis

Given the extreme K selectionist strategy of humans, the long dependency of the young and the investment that each offspring represents, I would argue that one of the strongest selective pressures operating on human behavior is, and has been, for minimizing fluctuations in the resource base, or, maximizing subsistence security. Strategies that assure enough resources are available to raise an offspring to maturity and that decrease the chance that offspring will be subject to extreme nutritional deprivation should be strongly favored by selection.

Additionally, when perennial storage techniques are developed, humans should adopt the Bayesian solution as the optimal strategy. If the appropriate subsistence resources are available, strong selection pressure will exist for the development of perennial storage. This will include subsistence and economic strategies and tactics that increase the effectiveness of storage in maximizing subsistence security.

The importance of subsistence security and storage, and hence their selective value, will be greatest as humans enter habitats that are unstable or have low predictability of subsistence resources, and as humans switch subsistence strategies.¹

This synthesis provides a theoretical framework for examining change in human behavior in general and human subsistence behavior in particular. In an earlier form this framework was used to model the origin of food production (Redding 1986). The rest of this paper will be devoted to constructing a model of the evolution of cultural complexity based on this theoretical framework and examining how the model might be tested with one source of data: archaeological faunal samples. However, before continuing I want to make one more point. Many models and explanations for cultural evolution have relied on a prime mover (e.g.: population growth, environmental change, warfare, trade) as the mechanism for change. Explanations using an evolutionary paradigm should not be categorized as a prime movers explanations. It is unlikely that a single selective pressure is operating on any behavior; instead, a number of selective pressures interact to produce a selective milieu. Structures and behaviors are affected by pressures acting for enhancement and diminishment and the result in any individual will reflect the interaction of these forces. And, variation in relative forces will occur among individuals of different age, sex, socioeconomic status, etc. The explanation I will offer identifies one of the positive selective pressures operating on cultural complexity. As an initial research strategy I offer it as the major force. However, remember that substantial variation does obtain and that this variation may only be understood with reference to all selective pressures operating on populations and an understanding of their phylogenies.

A model for the evolution of cultural complexity

Given the importance of subsistence security as a selective pressure operating on human behavior I would argue that increasing cultural complexity is related to the development of perennial storage capabilities and the development of strategies and tactics for using storage capabilities to reduce the risk of resource failure. The latter includes the integration of larger and larger areas into a "storage system". The addition of each producing unit in a system decreases risk to all individuals within the system. Such systems would require central administration of stored resources and decisions regarding distribution and production. Selective pressure for developing such systems and, hence, cultural complexity, should be strongest where significant variation exists from year to year in the resource base.

If an area contains resources that may be stored from year to year or food production is practiced, and if significant variation exists from year to year in the resource base, then increasing cultural complexity should characterize the area.

A hypothetical sequence: Initially, storage would be local and no specialization in subsistence tactics would be observed. Specifically, every production unit in an area is storing the same products in about the same proportions. However, if a risk of resource failure exists, pressure should obtain for the integration of increasingly larger and larger areas. The integration of larger and larger areas would be advantageous for two reasons:

- 1) subsistence resource failure in any one area of an integrated region may be partially or completely compensated for by centralized storage (collected from all areas by a central administration) or directly from production in another area of the region.
- 2) the larger the area the more environmental zones it includes and, hence, the risk from failure in any zone is reduced for individuals in the integrated region.

At some point, as the system increases in size, I would expect to see the development of

specialized subsystems. Specialization in subsistence activities becomes advantageous for two reasons:

- 1) it permits intensive use of a resource by the adoption of labor intensive techniques. This results in larger surpluses per unit of labor: greater storage per unit cost. In agriculturally based systems this might include the development of irrigation and full-time transhumance and, perhaps later, specialization in orchard crops.
- 2) it spreads risk among two or more subsystems: hence, short falls in production due to failure in any one subsystem can be compensated for not only from stored resources but by production in other subsystems.

Clearly specialization and increasing size of the system are inter-related. What we should see over time is the increasing integration of a region into a "storage system" that increasingly reduces the risk associated with failure of food resources. Increasing integration of larger and larger areas with more subsystems and the development of larger storage and redistribution systems require the development of an increasingly larger and more complex administrative system.

If pressure for subsistence security is one cause for the development of increasing cultural complexity this leads to a number of testable implications:

- 1) A tendency towards cultural complexity will appear in areas that have high average yields (permit storage) and exhibit variation in annual yields (resource shortfall is a problem with which individuals must deal).
- 2) Complexity, initially, will center on storage and redistribution of subsistence resources. Later it will include objects that can be traded for subsistence resources.
- 3) Evidence for intensification of subsistence subsystems will appear after the development of a regional storage network. Further, as regional storage systems become more elaborate and centralized, we should see the investment in intensification.
- 4) Specialization in production should not appear until a regional storage network develops. Further, as regional storage systems develop we should see increasing specialization, including some individuals investing in risky, high yield resources or tactics that have been previously ignored.
- 5) As regional integration develops it will be advantageous for peripheral groups to join. They obtain increased resource security and at the same time are able to specialize, increasing productivity. Due to this attraction, developing complex societies should expand peacefully until they start to compete for peripheral groups. Hence, expansion, initially, should be peaceful and non-military.
- 6) Complex societies will break-up when local populations do not receive external subsistence support required because of local specialization or local resource failure. More peripheral groups should break away first and after breaking away they should exhibit a shift to less specialized production and away from intensification.

I do not claim originality for this model for the evolution of cultural complexity. Adams (1978:333) has pointed out the importance of identifying the "adaptive strategies" of the primary producers in examining culture evolution in Mesopotamia. He concludes that a dynamic between a strategy of stability and one of resilience² might be useful in explaining the evolution of culture in Mesopotamia. Athens (1977) has suggested that subsistence is extremely important in

understanding the evolution of complex societies. He sees stability of energy flow into the system and environmental variation as critical variables. Athens (1977:376) even discusses the importance of area exploited and intensification as tactics for assuring stable energy flow in the face of unpredictable perturbations. What I suggest is unique is the theoretical bases I have provided for many of these arguments. Further, this model accounts for the evolution of cultural complexity among groups employing hunting and gathering as well as those engaged in food production. This is a much more general model for the evolution of cultural complexity. It even offers predictions on the collapse of complex societies (see number 6 above).

The model offered is preliminary and I do not propose to undertake any formal test of any of its predictions, but I would like to illustrate the utility of one source of data in examining the implications of the model. The database I will examine is the faunal material from sites in the Middle East, explicitly faunal data from sites in southwestern Iran, highland Iran, southern and northern Iraq and Syria, and Anatolia. In particular I will examine the data available for two variables: the ratio of sheep to goats and the ratio of sheep-goats to cattle. I will be interested in identifying **patterns** in the data sets and attempting to explain the patterns in terms of the explanation for the evolution of cultural complexity offered above. Additionally, I will be assessing the problems with and the value of the present faunal database, and, using the explanation, suggest directions for future research on faunal remains from the area.

Middle Eastern faunal data

Before documenting and attempting to explain patterns in the faunal data, the nature of the data base and potential problems with it must be examined. First, the faunal analyses that are used were done by a number of individuals using different techniques and, frequently, reporting their results in different forms. Further, the faunas were collected by a number of projects using different techniques and with different goals. To minimize the effects of the use of different methods to calculate abundance, in particular MNIs (minimum number of individuals), I have used raw counts, NISPs, to construct all ratios. To avoid biasing due to small sample sizes I have used only samples of sheep and goat bones that had at least 20 identifiable elements to calculate the sheep/goat ratio, and samples with 50 identifiable bovid elements to calculate the sheep-goat/cattle ratio.

I have not been able to control for differences in excavation technique. Some of the samples are the result of careful screening, others are bones and bone fragments selected in the field by non-specialists as being identifiable. In general these differences should not result in significant biasing of the ratios except where the samples are extensively presorted by non-specialists. In this case, an all too common occurrence, cattle elements would be preferentially saved because they would be larger (an attribute for some reason associated by the non-specialist with identifiability). This type of selective retention should result in an over estimate of the number of cattle per sheep-goat. Another important consideration for this study is the excavation strategy of the principal investigator. Studies of samples drawn from Lagash (Mudar 1982) and Terqa (Galvin 1981) found important differences between units associated with temples and units associated with small structures (residential areas?). Hence, any explanation for observed patterns must include a consideration of contextual differences.

In this analysis I use NISPs to establish measures of relative abundance and use of different taxa. I frequently encounter skepticism that NISPs, and or any measure derived from faunal data,

can be used to establish relative abundance within a site let alone between sites. Problems certainly exist with using NISPs to establish relative abundance and although I do not intend to undertake a detailed defense of their use, I would like to justify the approach used below. Certainly the faunal remains recovered from a site have been subject to a series of cultural filters and preservational processes. Hence, the faunal remains may provide a data set biased by a number of filters and processes. However, frequently the filters and processes act uniformly across a site and may be ignored, or by examining changes in ratios between taxa rather than counts or percentages the effect of the filters and processes may be canceled out. Grayson (1984:94-96) recently suggested that MNIs (minimum number of individuals) or NISPs, or any ratio based on them, cannot provide a valid estimate of relative abundance. I certainly agree with Grayson's arguments concerning the problem of aggregation with MNIs and would not use this measure to provide an estimate of relative abundance. However, this is not a problem with NISPs. Grayson argues that NISPs cannot provide a robust measure of relative abundance because they represent the maximum number of individuals and we do not know how an estimate of maximum number of individuals relates to actual abundance. While we do not know the relationship, and indeed we may never know it, this is not a reason to abandon the use of relative measures.

The validity of the use of NISPs to provide measures of relative abundance will only become apparent by attempting their use and if patterns appear then they need to be examined. A pattern based on a single measure of abundance, while interesting, must be considered as tentative. When two sources of information on relative abundance of taxa present a similar pattern within and among sites, this provides strong evidence of the reality of the pattern. It has been suggested to me that patterns identified in faunal remains are epiphenomena, even when they occur on a regional scale, and are not of interest. If patterns are identified in the faunal data they may be the result of biasing forces, but, as an initial research position I would argue that patterns in the data are more likely to be explained by spatial and temporal variation in subsistence strategies and tactics used by the inhabitants of the site or sites. If this position is incorrect, then over time we will find that serious discrepancies exist between explanations or models of human subsistence we develop and the data. Even if the empirically identified patterns prove to be the result of biasing processes by using the approach advocated above we should gain insight into and learn to identify where and how the biasing agencies effect faunal samples. This will help us in compensating for their effects. Either way we will learn more about quantifying faunal data and gain insights into the nature of faunal data and how it may be effectively utilized.

Patterns in the data

A list of the sites included in the following analysis is provided in the appendix. The ratio of sheep-goats to cattle and the ratio of sheep to goat are provided for each phase at these sites. The ratios are derived from NISPs. The appendix includes citations for most of the sites that are referenced in the bibliography. Ratios for several sites were provided to me by M.A. Zeder. These are noted in the appendix as, "Zeder, personal communication". Some of the sites so referenced come from her work and others are summaries she has derived from the literature. I thank her for the use of tables she has prepared for publication.

The ratio of sheep-goats to cattle

Figure 2 presents the ratio of sheep-goat to cattle for all sites and periods from 7000 through 100 B.C. Figure 3 is the same plot less four data points from the sites of Chogha Sefid and Tepe Tula'i. These four points have an unusually high ratio and their inclusion in Figure 2 hides the detail apparent in Figure 3. The cattle during the periods represented by the four points are wild. In Figure 3 cattle appear to increase in occurrence, relative to sheep-goats, after they are domesticated (about 5500 B.C.), and then stabilize maintaining a ratio of between one to ten sheep-goats per cow/bull/steer. However, a number of sites form a rather scattered second tier on the graph between 4000 and 1800 B.C. This second tier exhibits wide variation with ratios

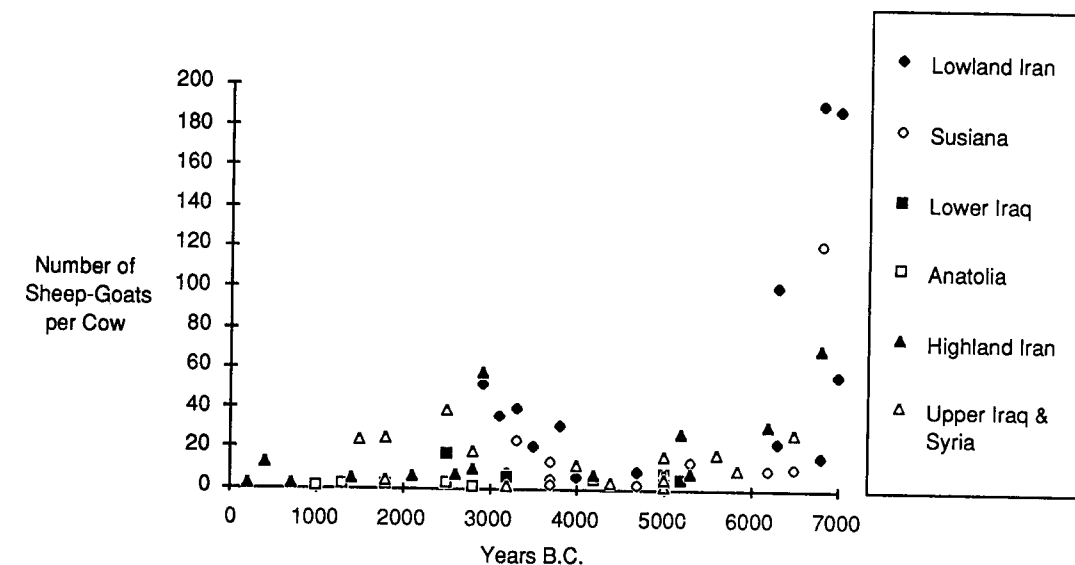


Fig. 2 Number of sheep-goats per cow for sites in Mesopotamia, Turkey and Iran from 7000 to 500 B.C.

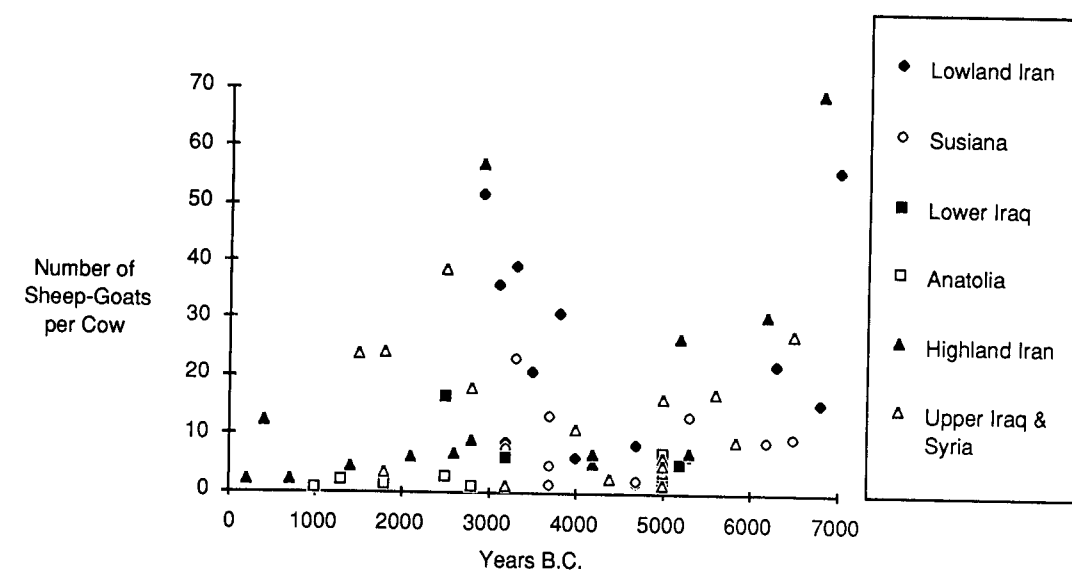


Fig. 3 Number of sheep-goats per cow for sites in Mesopotamia, Turkey and Iran from 7000 to 500 B.C. less data from two sites with extreme ratios (see text).

between 20 and 60 sheep-goats per cow/bull/steer. Sites of this second tier seem to disappear after 1800 B.C., but note that after that date we have data only from highland sites. Given the assumption that most of the variation between sites reflects differences in subsistence tactics what can we conclude from the data? I would suggest that they indicate increasing specialization of food production subsystems with individuals from sites in the lower tier either primarily involved in cattle pastoralism or agriculture and individuals from sites in the upper tier less involved in agriculture and more involved in sheep-goat pastoralism.

I expect increasing intensification and specialization of agricultural production and alteration of the plant community to be associated with an increase in the number of cattle relative to other animals and a shift in the rôle of cattle for at least five reasons. First, in areas of intensive agricultural production an increase in the number of cattle will obtain because of the importance of cattle in traction, specifically plowing, transport of field produce and threshing. In the Near East at present cattle seem to be the preferred plow animals, except when mules are available, and, we have representations in Egypt and Sumer of cattle plowing and threshing. Second, cattle require less labor to control and maintain than sheep-goats; frequently cattle can be left to graze independently while the herder engages in agricultural activities. Third, cattle require greater access to higher quality forage. Fourth, cattle provide more milk per unit of labor and, hence, are more efficient providers of milk (Behnke 1980:31-34) as well as providing milk year round because of the long dependency period of the offspring. Fifth, cattle dung is collectible and can be used as fuel as areas of trees and shrubs are reduced or eliminated. Additionally, a relationship between irrigation and maintenance of large numbers of cattle may exist. Cattle require water every day and in large quantities (Behnke 1980:26-27). In areas in which irrigation is not practiced, dry-season water may be long distances from the settlement. But, after the introduction of irrigation a year-round source of water is available and this allows the increased use and dependence on cattle. To summarize, I would expect increasing utilization of cattle at a site or within a site as dependence on agriculture increases. Hence, the ratio of sheep-goats to cattle should decrease in areas that allow the development of intensive agriculture.

An independent test of the proposition that increased involvement in agricultural production is related to higher numbers of cattle at a site is possible. As suggested above, Figure 3 seems to provide evidence of two groups of sites. The first (lower) tier of sites have from one to ten sheep-goats per cow/bull/steer. Based on the discussion above, the subsistence strategy used by the majority of individuals at these sites should be intensive agriculture. The second group is formed by sites with between 15 and 55 sheep-goat per each cow/bull/steer. Based on the discussion presented above, the subsistence strategy used by the majority of individuals at these sites should be less intensive agriculture or sheep-goat pastoralism. Using statements by excavators, reports of the botanical remains and evidence from survey I have attempted to classify each period at each site for which I have a sheep-goat/cattle ratio as either more or less involved in intensive agriculture. The results of this classification are provided in Table 1. The mean for the ratios of sheep-goats/cattle for samples classified as involved in more intensive agriculture is 11.01, while the mean for the samples classified as less involved in agriculture is 29.87. Two periods at Tepe Farukhabad have high ratios but were classified as more involved in intensive agriculture (without these two samples the mean ratio drops from 11.01 to 6.67). Later on in this paper I will suggest a reason for their "misplacement" in the table. Several samples were excluded from this table and analysis because: 1) they are from periods prior to the domestication of cattle; 2) they represent Elamite deposits that come from an outpost that may have been supplied from centers external to the area; 3) they are from Anatolia where low ratios seem to be

Table 1
A comparison of the sheep-goat/ cattle ratio by phase at sites that could be classified as more or less involved in intensive agriculture

Site	Phase	More Intensive	Less Intensive
Tepe Sabz	Sabz	6.1	
	Mehmeh	8.0	
	Bayat	5.7	
Tepe Farukhabad	Early Uruk		20.7
	Middle Uruk		39.2
	Late Uruk	35.8	
	Jemdet Nasr	51.4	
Jaffarbad	Susiana a	13.0	
	Susiana b	2.0	
	Susa A	1.2	
Chogha Mish	Susiana a	1.3	
	Susiana b	1.6	
	Susa A	4.6	
Sharafabad	Middle Uruk	4.7	
Qabr Sheykheyn	Susiana d-Susa A		23.0
As-Sawwan	Samarran		13.0
Lagash	Early Dynastic III	16.2	
Sakheri Sughir	Early Dynastic	5.8	
Tell Terqa	Khanean	17.6	
Hadidi	Bronze	3.3	
Hajji Firuz	Hasanlu X		26.6
Tal-e Malyan	Banesh		56.7
	Kaftari	8.9	
Column Mean		11.01	29.87

related to specialized cattle production (i.e.: the tactics used in herding reflect a different strategy than employed in other areas of the Near East); 4) I was unable to determine the degree of involvement in agricultural production.

To fully test the implications of the explanation I have provided for the curves in Figures 2 and 3 we need survivorship data for cattle, preferably separate survivorship curves for males and females, from a variety of sites in different areas of the region. I expect to find an increase in the average age of slaughter with increasing involvement of a local group in agriculture. More specifically I expect to see a decrease in the number of males slaughtered between 1 and 3 years. It would be useful to have large samples of measured cattle elements as it is possible to obtain an estimate of the percent castrates if the sample is large enough. It would be very interesting to determine when castrates first appeared and if their numbers increase as involvement of the local population in agriculture increases. Most important for testing this explanation for the patterns observed in the ratio of sheep-goats/cattle is the development of a relative measure of agricultural intensification. If we could assume that site size (as an indicator of population) is related to the degree of agricultural intensification, then those sites that are largest should have the lowest ratios of sheep-goat to cattle. However, this ignores the problem of sampling on a large site (see section The data) and the problem of a small site that is a satellite of a large site and which is involved in intensive production for the large center. A potential solution to the second problem may be to use an estimate of regional population combined with site density.

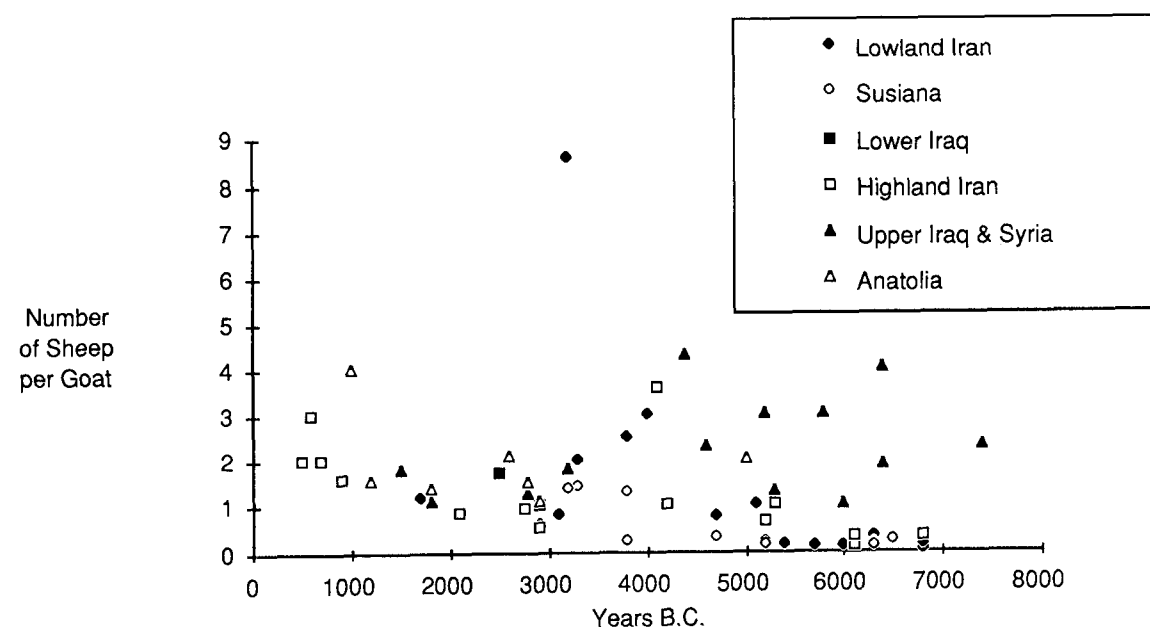


Fig. 4 Number of sheep per goat for sites in Mesopotamia, Turkey and Iran from 7000 to 500 B.C.

The ratio of sheep to goats

Figure 4 presents changes in the sheep/goat ratio from 7000 to 100 B.C. and, with the exception of an anomalous site on the Jebel Hamrin and a large cluster of sites from northern Iraq and Syria, a trend towards more sheep per goat is apparent. Ignoring the anomalies for the moment, of interest in this figure is the stability of the sheep/goat ratio from about 6500 to about 5200

B.C., the increase in inter-site variability after 5200 B.C. and the values that characterize the samples from the Deh Luran Plain. I suggest that this pattern reflects a general change in subsistence tactics after 5500 B.C. towards increasing specialization of food production subsystems. First, at about 5500 B.C. sheep, which had been of secondary importance to goats, probably because of their lower reproductive rate (Redding 1981a), suddenly become more important, probably because of the development of secondary products: i.e. milk and fiber. Later, about 4500 B.C. based on the appearance of a number of sites with higher sheep/goat ratios, specialized pastoralists, not necessarily nomadic, appear. These pastoralists herd primarily sheep because of the superior quality of their milk and because of the demand by an increasing population of agricultural specialists for wool and meat. Hence, the pastoralists are increasingly involved in exchange with specialized agriculturalists, who become less and less dependent on their own animals for subsistence products. Goats and cattle are maintained by the agriculturalists primarily for labor, milk and some meat, but agriculturalists obtain the majority of their meat and wool by exchange with pastoralists³. Finally, about 2800 B.C., based on the appearance from lowland Iran and Mesopotamia of sites with a high sheep/goat ratio, temple or state owned or controlled flocks of animals, primarily sheep, appear that are managed for maximum production of one or two specific products, probably wool and milk (Gelb 1965, 1967). The locus of specialized pastoralism may have shifted at this point to the highlands because pastoralists were now being actively discouraged from using lowland pastures previously available to them. All of these dates are tentative, first estimates, and subject to change based on future research.

We now must deal with the sites that do not fit this trend, the Jebel Hamrin site and the cluster of sites from northern Iraq and Syria. The site on the Jebel Hamrin is Tell Rubeidheh and the fauna was published by Payne (1988). Tell Rubeidheh is a small poor village dating to the Middle-Late Uruk (Crawford 1988:136). On the basis of the faunal remains it may have been dedicated to wool production. Such sites were known in later periods (Matthews 1978). The cluster of sites in northern Iraq and Syria have unusually high ratios long before other sites in the study area. This may reflect a regional tactic of semi-nomadic pastoralism based on sheep. If this is the case then studies suggest that the ratio in the flocks should be about 10 sheep for every goat (Redding 1981). The ratios for the northern Iraq and Syria sites range from 2.5 to 6.0:1. But, these ratios are consumption ratios; that is, they are ratios reflecting the ratio of sheep to goats consumed. The ratios do not reflect or even necessarily resemble the ratio of sheep to goats in the flocks. Given the differences in reproduction between sheep and goats and an expected ratio in the flocks of 10:1 it is possible to calculate expected consumption ratios. The expected consumption ratio should be about 6.0:1 (Redding 1992).

A variety of evidence is available to support the explanation offered for the patterns in Figure 4. In relation to the beginnings of the use of sheep for secondary products I cite the appearance of spindle whorls in large numbers during the Sabz Phase (circa 5500 B.C.) at Tepe Sabz (Hole et al. 1969). As regards the appearance of specialized pastoralists, Wright (n.d.) states that the earliest evidence of pastoralists in the highlands behind the Susiana Plain is 4500 B.C. Further, consider the anomalous points in Figure 4. One group of three anomalous points is from the Deh Luran Plain, an area marginal to lowland Mesopotamia and the Susiana Plain. The sites on the Deh Luran Plain after 5500 B.C. have, in general, a high number of sheep per goat. The Deh Luran Plain is ideally suited to pastoralism as high, summer pastures would have been available within one or two days of any of the sites on the plain.

Flocks of sheep could have been collected and sent either to the Susiana area or lowland Mesopotamia (the Tigris is visible from the first ridge behind Deh Luran). I suggest that the Deh

Luran area was devoted primarily to pastoral production, although agriculture was practiced, even during those phases when the population was relatively dense. An interesting bit of data supports this scenario. Remember those misclassified ratios of sheep-goats to cattle. They are from the Deh Luran Plain. So while the sheep-goat/cattle ratios were high the sheep/goat ratios were also high. The misclassification comes from the fact that all the excavators have assumed that the Deh Luran area was involved in agriculture. I am suggesting that while agriculture was practiced the sites were large herding communities and processors of herd products.

The sites on the Susiana Plain with the highest sheep/goat ratios are Tepe Sharafabad and Qabr Sheykheyn. Both sites are located on the margin of the plain, close to the highlands. Tepe Sharafabad is close to the Vale of Andimeshk, a large area not suitable for irrigation agriculture, but which was a fine source of seasonable graze and browse that was within two days of mountain valleys. Cups and counters are two items recovered in a context that suggests they were leaving the site (Wright et al. 1980). These may have been used to record transfers of sheep as well as agricultural products. I suggest that Sharafabad and Qabr Sheykheyn, although both may have been surrounded by fields and perhaps gardens, were primarily the homes of individuals involved in pastoral production. Sharafabad and Qabr Sheykheyn also happen to be the sites on the Susiana Plain, occupied after the domestication of cattle, with the lowest number of cattle relative to sheep and goats.

After 2800 B.C. we have texts that deal with the collection and redistribution of animals and animal products. These documents form an important corpus of data that has already provided interesting information on herding strategies and tactics (e.g. Gelb 1967), but the documents need to be completely and systematically studied. Although temple and state owned herds are described in the texts we have very little information concerning the level at which decisions affecting herd structure were made. The documents do provide some information on exchange with nomads. The texts from Tell Drehem seem to indicate that a large percentage of the animals came from pastoral groups (Schacht n.d.). The Mari texts contain a great deal of information concerning the interaction of nomadic pastoralists and the urban and rural agricultural population (1978). These textual sources indicate that the majority of animals coming from pastoralists were sheep.

This explanation for the shape of the graph in Figure 4 has a number of implications that can be tested with future research. The most obvious is that in those sites that were loci of intensive agricultural production the age-sex structure of the survivorship curves for sheep should differ from those for goats. Since sheep are being brought into the site in higher numbers the sheep curve should contain: 1) almost no individuals under the age of nine months; 2) a large number of individuals, mostly males, in the age range from nine months to two years; 3) a small number of animals, mostly females, that range from two to four years in age; 4) after 4.5 years of age the curve should turn down sharply and most of these animals should be females. The goat curve will differ in that, since the majority of the animals used are kept at the site, a higher number of individuals from neonate to nine months and a higher number individuals of both sexes between two and four years of age. These expectations for survivorship curves are based on schedules of mortality and fertility developed in a previous study (Redding 1981a). Only the fauna from Tell Terqa (Galvin 1981) has published, separate survivorship curves for sheep and goats. Unfortunately, the usefulness of this study is limited by the small sample size that forced a very coarse grouping of the fusion data.

In sites occupied year-round that were the loci of pastoral production the sheep and goat survivorship curves should have, with the exception of one age class, an almost identical age-sex

structure. They will be similar in that both should have a few number of individuals of both sexes under the age of nine months, a few females between two and four years of age and a small number of individuals, mostly females, over the age of 4.5 years. The sheep curve will have fewer animals when compared to the age curve for goats in the age class between one and two years of age because rams in this age class are being used for exchange. Although the sample is too small to allow the construction of valid separate curves for sheep and goats, this is the pattern that I obtained from fusion data from Sharafabad (Wright et al. 1980), a site which I believe was heavily involved in pastoral production.

At sites within a region that were the loci of pastoral activity I expect a relatively higher sheep/goat ratio than at site that were the loci of agricultural activity. Further, in sites that were the loci of intensive agricultural production variation should be observed in the ratio of sheep to goats consumed between areas of a site based on the subsistence basis of the individuals contributing to the deposit in each area. Goats, which require less labor than sheep, should have been maintained by individuals involved in agriculture who probably lived on the edges of sites near fields. The goats these people would have consumed would be young males and dying, injured or diseased animals. Individuals involved in administrative and craft activities would have preferential access to animals obtained by the redistribution system. These animals were primarily sheep, probably mostly young males. Hence, garbage associated with residences of farmers exhibit a lower sheep/goat ratio when compared to garbage from residences around temples, public buildings, palaces, and craft production areas. In a study of the fauna recovered from Tal-e Malyan, located in southcentral Iran, Zeder (1984) compared the sheep/goat ratio for two different types on contexts: elite residential/public structures and domestic/craft structures. Fortunately for the argument just presented, she found no differences in the sheep/goat ratio between the two contexts. Unfortunately, both were heavily biased towards goats, but we have no clear lower class domestic structures from the site as a comparison.

In a similar argument to the one just presented, since sheep are being brought into the site and distributed while goats live on the site and are consumed by local herders, I might expect to see a difference in body part distribution between the two species. In particular, goat distal limb elements should be more broadly represented and evenly distributed throughout the smaller structures on the sites margin. Sheep distal limb elements should be concentrated in dumps around centers of redistribution and not around residences.

What is needed to test these implications is data from a variety of sites and more complete analyses of the faunas. In particular we need separate survivorship curves for sheep and goats and data on sex ratios. We need faunal data from a number of contexts in each site and from different types of sites.

Summary

The scenarios I have developed to explain the shapes of the curves can, in themselves, be tested. Each require certain species specific survivorship curves and sex ratios at the various sites. I have detailed these implications here and in an earlier paper (Redding 1986).

In at least three papers to date I have argued that subsistence security is a strong selective force in shaping human behavior. To summarize some of these arguments. Successful capture and security of subsistence resources is fundamental to reproductive success. For this reason a strong relationship between behavior and subsistence must obtain. Further, because of the K selectionist

reproductive strategy of humans, the long dependency period in humans, and the environmental variability humans have encountered a major concern of humans must be subsistence security. Hence, I would expect a strong interaction between the evolution of subsistence systems and human behavior. I have suggested that increasing specialization in subsistence and increasing integration of larger and larger areas, both of which enhance resource security, may be a strong determinant of the development of complex societies. I have established a number of implications of this explanation that can be tested with future research. Further, I would suggest that if we want to understand the evolution of cultural complexity we need better samples of flora and fauna, and studies of these remains that have a sound theoretical base.

NOTES

- 1 As an aside, an interesting and testable implication of the relation of subsistence security to rearing offspring is that within a human group young, sexually mature individuals without children should be more likely to engage in risky subsistence behaviors.
- 2 The definition of resilience used by Adams is a concern for long-term survival.
- 3 Cattle and goats (rather than cattle and sheep) become the preferred animals of individuals involved in intensive agricultural production for reasons set forth in Redding, 1981a, 1992.

APPENDIX

A list of sites used in this study, presented by area, with the reference and the values for the sheep-goat cattle and the sheep/goat ratios by phase.

	s/g	s-g/c
Lowland Iran		
Ali Kosh and Tepe Sabz (Hole, Flannery and Neely 1969)		
Bus Mordeh		55.8
Ali Kosh	0.03	15.3
Mohammad Jaffar	0.32	22.0
Sabz	0.17	6.1
Khazineh	1.00	
Mehmeh	0.75	8.0
Bayat	3.00	5.7
Choga Sefid (Wheeler n.d.)		
Ali Kosh	0.16	188.0
Mohammad Jaffar	0.16	
Sefid	0.09	190.0
Surkh	0.12	100.0
Choga Mami Trans.	0.13	
Tepe Farukhabad (Redding 1981b)		
Farukh-Bayat	2.50	30.9
Early Uruk		20.7
Middle Uruk	2.00	39.2
Late Uruk	0.83	35.8
Jemdet Nasr-Early Dynastic	0.62	51.4
Elamite	1.20	4.1
Tell Rubeidheh (Payne 1988)		
Middle-Late Uruk	18.3	8.6

	s/g	s-g/c
Susiana Plain		
Choga Mish (Wheeler n.d.)		
Archaic Susiana 1	0.24	9.6
Archaic Susiana 2	0.12	8.9
Archaic Susiana 3		5.1
Susiana b		1.3
Susiana c		1.6
Djaffarabad (Wheeler n.d.)		
Susiana a	0.14	13.0
Susiana c	0.33	2.0
Susiana d - Susa A	0.23	4.6
Susa (Wheeler n.d.)		
Susiana d - Susa A		1.2
Tepe Tula'i (Wheeler 1977)		
Late Mohammad Jaffar- Early Sefid		120.7
Qabr Sheykheyn (Palsgaard n.d.)		
Susiana d - Susa A	1.30	13.0
KS-54 (Mudar 1988)		
Uruk		7.4
KS-36 (Mudar 1988)		
Uruk	1.4	67.9
Tepe Sharafabad (Wright et al. 1980; Redding, unpublished data)		
Middle Uruk	1.43	23.0
Southern Iraq		
Tell As-Sawwan (Flannery and Wheeler 1967)		
Samarran		4.7
Sakheri Sughir (Bokonyi and Flannery 1969)		
Early Dynastic		5.8
Lagash (Mudar 1982)		
Early Dynastic III	1.72	16.2
Northern Iraq and Syria		
Umm Dabaghiyah (Bokonyi 1973a)		
5800-5900?		8.8
Terqa (Galvin 1981)		
Khanean	1.27	17.6
Hadidi (Clason & Buitenhuis 1978)		
Bronze	1.82	3.3
Arpachiyah (Zeder personal communication)		
Halaf		2.1
Banahilk (Zeder personal communication)		
Halaf		3.0
Arjouna (Zeder personal communication)		
Halaf		3.0

Redding		Subsistence Security
	s/g	s-g/c
Sabi Abyad (Zeder personal communication)		
Halaf	1.3	3.4
Ras el-Shamra (Zeder personal communication)		
Halaf		1.1
Yarim Tepe (Zeder personal communication)		
Halaf		5.9
Shams ed-Din (Zeder personal communication)		
Halaf	3	4.5
Umm Qseir (Zeder personal communication)		
Halaf	3	16.1
Late Uruk		1
Bderi (Zeder personal communication)		
Akkad		38.5
Late Bronze		23.5
Kashkashoq IV (Zeder personal communication)		
Hassuna		27.3
Khabir	3.1	24
Tell Kuran (Zeder personal communication)		
Kuran	4.3	10.7
Mashnaqa (Zeder personal communication)		
Ubaid	2.3	2.3
Feyda (Zeder personal communication)		
7400 BC	2.3	
Bouqras (Zeder personal communication)		
6400 BC	4	
Tell es-Sin (Zeder personal communication)		
6400 BC	1.9	
El-Qitar (Zeder personal communication)		
1800 BC	1.1	

Anatolia

Korucutepe (Boessneck and von den Driesch 1974)		
Early Bronze	2.10	2.5
Middle Bronze	1.38	1.2
Late Bronze	1.55	1.9
Early Iron	4.00	0.5
Karataş-Semayuk (Hesse and Perkins 1974)		
Early Bronze II	1.50	0.8
Girikihacıyan (Zeder personal communication)		
Halaf	2	4.2
Hayez Höyük (Zeder personal communication)		
2900 BC	1.1	

Redding		Subsistence Security
	s/g	s-g/c
Highland Iran		
Sarab (Davis 1984)		
Early Ceramic Neolithic	0.33	69.0
Late Ceramic Neolithic	0.10	30.4
Siahbad (Davis 1984)		
Late Ceramic Neolithic	0.33	
Siahbad and Choga Maran (Davis 1984)		
Early Chalcolithic	1.00	6.8
Choga Maran (Davis 1984)		
Middle Chalcolithic	3.60	4.8
Early Bronze	1.00	5.7
Jammeh Shuran (Davis 1984)		
Iron Age I-III	1.60	4.1
Achaemenid	12.0	8.8
Early Parthian	2.00	3.6
Hajji Firuz (Meadow 1983)		
Hasanlu X	0.63	26.6
Tal-i-Iblis (Bokonyi 1967)		
4400-4100 BC	1.1	6.6
Tal-e Malyan (Zeder 1984)		
Banesh	0.53	56.7
Kaftari	0.93	8.9
Middle Elamite	0.85	6.6
Tepe Nush-i Jan		
Median	2.00	4.8
Parthian	3.00	3.8

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MILK, BUTTER, AND CHEESE

Marten Stol

(Vrije Universiteit, Amsterdam)

Our knowledge of milk and dairy products in ancient Mesopotamia is based on a very limited number of sources, the bulk of which are early: their number rapidly decreases in the Old Babylonian period, and the more recent Assyrian or Babylonian texts offer very little. This author wrote simultaneously the article *Milch(produkte)* for the "Reallexikon der Assyriologie" (completed in March, 1991) where the reader will find a strongly philological description, in a more objective style. Here, studies on Sumerian or Babylonian words or cuneiform signs and detailed references to passages in texts are kept to a minimum in order to make this contribution palatable to the wider readership of this Bulletin.

Sources. In the first place, we have as source the Sumerian - Babylonian "dictionary" of words, thematically arranged; in tablet XXIV, the "chapter" dealing with all sorts of foodstuffs, milk and its products are listed. Most extensive are the Old Babylonian "Forerunners" with only one column, in Sumerian. Hidden in the Babylonian "pharmacopea" Uruanna, a similar dictionary, there is a short section on cheese and related products, so it seems.

In the second place, there are numerous administrative texts mentioning "milk", "butter" / "ghee", and "cheese" (sometimes qualified as "large" or "small"). Almost all these texts are written in Sumerian and most of them are older than the Old Babylonian period; they date to the third millennium B.C. These products almost invariably serve as offerings for the gods. We cannot learn anything from these lists on the techniques of butter- or cheese-making. More interesting are those administrative texts of the Ur III period that show us how much ghee or cheese was expected from cows and goats; the most important ones were studied by I.J. Gelb (1967) and Tohrü Gomi (1980). M. Civil warned us at the meeting that the amounts given perhaps are not the full yields because the share of the herdsman possibly had already been deducted.

As third source can serve "bucolic scenes" in Sumerian literary texts. There, the world of Dumuzi, the herdsman in Sumerian mythology, about whom so many compositions exist, is depicted in vivid colours. According to "Dumuzi's Wedding" he brings, as shepherd, milk products in vessels hung at his side. He is often described as "churning" milk in the vessel *šakir*; this activity, going together with the singing of the song *ilulam*, was in general the hallmark of prosperity and peace. On the other hand, a smashed or abandoned *šakir* meant desolation and even death. A lengthy passage in one of these texts gives much information on the processing of milk in various ways; we owe to Th. Jacobsen (1983) a recent edition of these lines, with an expert commentary. Unfortunately, the technical terminology used is restricted to this text and to entries in the Sumerian - Babylonian dictionary, mentioned above: one often can only "etymologize" these words.

A fourth source is a passage in the Disputation between the herdsman Dumuzi and the farmer Enkimdu each of whom is extolling his own products.¹ The farmer boasts of clothing (made of flax), beer (made of barley), flour, bread and pulse. In contrast, Dumuzi acclaims the following products: his black and white ewes and a number of dairy products some of which are "poured", others "given". This suggests fluid and solid states. The products are as follows:

“poured” are *ga.SIG₇.a* which we will identify with sour milk; and yoghurt; “given” (S.N. Kramer, J. van Dijk, A.W. Sjöberg) or “poured” (M.Civil) is *ga.ki.si.[m.ma]*, Akkadian *kisimmu*, possibly a product in connection with cheese; “poured” is *ga.BUL.a* (= ?); “poured” is *ga.ú*, lit. “herb(s) milk” in which we may see cheese flavoured with herbs; “given” is *ga.ú.ti.ir.da*, lit. “extra milk” (Akkadian *itirtum*); “given” is *ga.NU[NUZ.T]E* (butter-milk, with additives?) (misread as “honey cheese” in earlier lit.); “given” are small cheeses. Jacobsen assumed that this list “proceeds from the more to the less valuable items”. The quality of beers in the farmer’s products, indeed, is in descending order. Still, one rather thinks of a sequence like: fluid – solid products (with *kisimmu* as a possible exception?), or: the process of cheese-making, starting from yoghurt and ending with small cheeses.

A fifth source is art: the “dairy freeze” from Ubaid and a number of scenes on cylinder seals, especially those on the “Etana” seals (Collon; Seibert). They all date to the third millennium B.C.

Our method in studying all this material is “heuristic”. We study the traditional practices in the modern Middle East and will see if we can find back (Greek *heurein*) elements of them in the ancient texts. This has not been attempted in a systematical way before. Scattered remarks by K. Butz in recent literature refer to techniques applied in temperate zones like Bavaria and are less useful.² The bibliography gives the ethnographical literature used by us. Most extensive and very expert is Dalman who pays not much attention to the terminology in Northern or Eastern Syria.³ Digard is the only author to give percentages for dairy products in relation to the milk.⁴ Note that the Bakhtiyari studied by him make cheese from sour milk which is not done in the countries that interest us. It is unfortunate that we have so little ethnographical material from southern Iraq.

Fresh milk. Fresh milk cannot be kept for more than a few hours and is hardly drunk. This is true for modern and ancient times. The cuneiform texts mention milk (Sumerian *ga*, Akkadian *šizbu*) only as “suck” or, more often, “eaten”, by newborn children or young animals. Furthermore, milk was offered to gods.

The first milk which the mother (animal) gives, flowing during three days (Sweet 102, Watson 111), is named ‘colostrum’ in Latin and English; also ‘beestings’ in English. The terminology in Semitic languages was investigated by Löw in 1908 (Arabic *laba’a*, etc.); in Ugaritic it is *šhp* (KTU 1.10 III 25); cf. Syriac *šḥāfā*. I cannot find colostrum in the cuneiform texts with certainty. The milk *ga.TAG.a* in the texts from Ur is a possibility: low quantities are delivered in months I and IX only. Applying the reading *zīl* to TAG here (*ga.zīl.a*), one is led to the milk (product) *ga.zi.il.lá* in the lexical texts; Akkadian *eldu*. And indeed, *eldu* is the word in the Sumerian - Akkadian lexicon right after “(fresh) milk” and “cream”. According to the Sumerian dispute of Ewe and Grain, the gods drank “excellent *ga.zīl*” from the udder (32): did they enjoy colostrum? As to the Akkadian word *eldu*, can we interpret this word as “new”, **ešdu*, normally **edšu* or *eššu*? A similar by-form is *qašdu* (*qadšu* being expected), “holy”. “New milk” is colostrum.

Modern literature hardly speaks of cream (Dalman 292, 300; *qašd* /*ḫa*⁵). The same is true for the cuneiform texts. The sign *gará* in Sumerian texts of the third millennium is considered to stand for “cream”; it was offered to gods, together with milk. In later texts the word is merely literary and becomes confused with “milk”. The Akkadian word is *lišdum* in which we recognize Hebrew **lašād* (Numbers 11:8). In modern Iraq, the cream of buffalo milk is much appreciated.

Sour milk. It was the milk of cows and goats that was processed by the ancient Mesopotamians; we never hear of sheep’s milk.⁶ At present, to the fresh milk a ferment (Arabic *rawba* and

variants⁷) is added, it is heated and left to develop into **sour milk** or yoghurt, Arabic *leben*, German ‘Dickmilch’. The only description of *leben* in present-day Iraq known to this writer, may be given here:

“– I made yoghurt from the water-buffalo milk, which was richer than the milk yielded by the settlement’s undernourished cows. (...) Still foaming, the milk was put to boil. It cooled during the night. In the morning we skimmed off the cream, a rich, thick butter-like substance (*gaymar*) which was delicious with jam on toast. To the rest I added a spoonful of yogurt starter, wrapped the pan in a towel to keep it at a constant temperature, and by late afternoon we had yogurt, for cooking, for eating, or for drinking if we diluted it with water”.⁸

Skimming off the cream is perhaps not done with the milk of the cows, sheep and goats that we are interested in. Sour milk is the basis for both butter- and cheese-making. Ur III texts inform us how much butter and how much cheese was obtained from a quantity of *ga.SIG₇.a* or *ga.še.a*. As Th.J.H. Krispijn suggested to this author, *še* very much looks like the pronunciation of the sign SIG₇. P. Steinkeller proved this for other contexts where the word means “to stay”.⁹ After the meeting, he pointed out to me that in Polish ‘zsiadte mleko’, “sour milk”, the first word is etymologically related to ‘siadad’, “to sit”. The word *ga.še.a* is frequently attested in the texts from Umma (but not exclusively there) and does not appear in the lexical tradition. The same can be said about the “Umma-word” for cheese, *ga.murub₄*, to be studied later. For us, it is clear that *ga.SIG₇.a* and *ga.še.a* stand for *leben* in any case.

As to the quantities, Gomi computed that the texts from Ur presuppose the conversion rates of sour milk of cows into butter as 1/15 and into cheese as 1/10, measured in volume. From texts from Umma we learn the approximate rates 1/20 for butter and 1/13 for cheese made of goat’s milk. At this point, we remind the reader of Civil’s warning about the possible herdsman’s share. The Midrash on Genesis 18:8 informs us that there are three qualities of butter; that of the lowest (?) quality (*qibār*) is 1/20 of the milk, 5% (Dalman 309). Digard gave for the Bakhtiyari the following percentages, measured in weight: one needs 2 kg of sour milk for making 1 kg of cheese and 6 kg of pure lamb’s milk for 1 kg of fresh (solid) butter, or 12 kg goat milk for 1 kg butter. We learn from remarks in Dalman that 100 *roḫl* fresh milk yields 5 1/2 *roḫl* of fresh butter, 5 *roḫl* of clarified butter, and 20 *roḫl* of cheese (302, 303 f.; Aleppo). H. Yedid gave in his study on a group of nomads in Hama (Syria) the following figures for sheep: from a total of 45.000 litres of milk, 500 litres are drunk at home as sour milk, 2.000 litres are sold, 14.200 litres are converted into butter-milk, 28.300 litres into cheese (Yedid 33).

“Butter”, “cheese” The processing of sour milk now follows two clearly distinct paths, the one leading to butter, the other leading to cheese. Both words, “butter” and “cheese”, are not what an European would think they are and deserve some comments. After having studied the traditional techniques of processing milk in the Middle East, it became clear to this writer that the “butter” of the ancient texts is clarified butter, ghee, Arabic *samn*, and the “cheese” must be Arabic *kišk* (with dialectal variants; or totally different words), the round white cakes made of either sour milk, or the “butter-milk” that is left after churning. “True” cheese, Semitic *gubn* (and variants), is quite another product, made of fresh milk by curdling it. Below, we will illustrate and, hopefully, prove our hypothesis.

The first argument, based on relative quantities, can already be given here. True cheese is 20% (Dalman 303 f.) or even 50% (Digard 195 f.) of the milk. These percentages in no way fit the 1/20 (5%) for the "cheese" of cows or the 1/13 (7%) for goats indicated by the Ur III texts. On the other hand, the 8% of *kašk* (goat's cheese) given by Digard (198) is a nice match for the 1/13 (7%) known for goat's cheese from the Umma texts.

Gelb and Gomi studied the yields of butter and cheese expected from cows in the Ur III period. Their texts come from Drehem and Ur, respectively. We can add two texts from Umma about goats (SET 130, AUCT II 391) which show that the Umma scribes wrote the word for "cheese" in a particular way, *ga.murub*. One expected 5 litres of ghee and 7 1/2 litres of cheese from a cow; 1/3 litre of ghee and 1/2 litre of cheese from a goat. The ratio between the yields of ghee and cheese is both for cows and goats always 2:3 in the Ur III and Old Babylonian periods. The earlier Presargonic texts show that at that time one expected 10 *silā* (= 15 litres) of ghee and 18 *silā* (= 27 litres) of cheese from a cow; the ratio between them is again 2:3.¹⁰

The Greek scientist and philosopher Aristotle wrote about cheese: "And there is more curd (*turós*) in cow's milk than in goat's milk; for graziers tell us that from one *amphoreus* of goat's milk they can get 19 cheeses (*trophalís*) at an obol apiece, and from the same amount of cow's milk, 30" (*Hist. Anim.* III 20; 522a, end). We observe the same ratio.

The price of ghee is given a few times; that of cheese never. A mathematical text tells us that ghee was 15 times more expensive than cheese (Gelb 67b).

Butter Butter (Arabic *zubb*) is commonly made by churning the sour milk in a goat-skin. Ethnographical lit. abounds with descriptions of the these goat-skins but a few times one comes across a special jar with a bar or obstacle inside.

Earthenware vessels are still used for making butter; cf. H.H. Hansen, *Investigations in a Shī'a village in Bahrain* (Copenhagen 1967) 94 f., with figs., F. 586 (named *mankhāda*): "Inside the jar at the bottom, a 0.12 m. long pointed bar of clay was placed, which acted as a churning stick"; H.H. Hansen, *An ethnographical collection from the region of the Alawites* (Copenhagen 1976) p. 24 and Plate VIII, c, F 747 ("Jar for churning", showing a hole for the funnel); al-Maqdissi, 469 fig. 4 (*kouteifé*); M. Feghali 178 (*khābye*); R. Cribb, *Nomads in archaeology* (1991) 78–9; *Alacahöyük. Ethnographische Skizzen eines anatolischen Dorfes* (Bern 1971) 355, 357 E. 7b ("Tonkrug zum Buttern"); M. Bazin, C. Bromberger, *Gilān et Azarbāyjan oriental* (1982) 34 f., Plate IIIb. Cf. E. Strommenger, *Habuba Kabira. Eine Stadt vor 5000 Jahren* (1980) 45, Abb. 25. Reminiscent of the churning vessel in Sumerian art is its being shaped like a gourd among the Marsh Arabs; see S. Westphal-Hellbusch, H. Westphal, *Die Ma'dan* (1962) 94: "Gebuttert wird bei den Ma'dan in einer Kürbiskalebasse, die man schüttelt, oder unter arabischem Einfluss in einem zu einem Schlauch zusammengenähten Ziegenfell, dessen behaarte Aussenseite nach innen gewendet ist" (cf. Abb. 24, after p. 96, for the goat bag). – A churning vat is depicted on a 3rd millennium cylinder seal; see S.N. Kramer, *Le mariage sacré* (1983) 61.

It is striking that the Sumerian texts only mention the jar, according to one of its pictograms provided with a stick inside (*šakir*); it is likely that the more primitive nomads used skin bags already at that time but there is not a single hint, not even in the lexical traditions. Note that it was the tent-dweller Jael who kept fresh milk in a bag (*n'ōd*, Judges 4:19). Skin bags for milk (*nakrimu*) are hardly attested in the cuneiform texts. "Churning" is

in Classical Arabic *maḥāda*, in Hebrew *mīš* (as M.Held could prove in 1985), Akkadian *māšum*. The result of churning are (solid) flocks of butter (Arabic *zubb*) floating on top and a large quantity of butter-milk (Rosenhouse 51 § 38); according to Digard 15 and 85% respectively. The butter will keep only a few days and it usually boiled after which it cools down to the well known "clarified butter" or "ghee" (in India), Arabic *samn*, which can be kept for many months.

Let us now look at the Sumerian-Akkadian terminology. What is commonly translated as "butter" (by some as "ghee"), is *ī.nun* (lit. "princely oil") in Sumerian and *himētum* in Akkadian, a word of unknown etymology. Dalman suggested a connection between its Hebrew cognate and the stem *hamū* in Arabic, "der vom Festwerden der Milch verstanden wird" (Dalman 310). A variety of texts show that this butter was stored in vessels also used for oil and other liquids which suggests "clarified butter". The percentages in the Ur III texts are 6.66% (1/15) of the 100% sour milk for the *ī.nun* of cows and 5% (1/20) for that of goats. The latter figure fits ghee in modern Aleppo: out of 100 *roṭl* one gets 5 1/2 *roṭl* of fresh butter and 5 *roṭl* of ghee (Dalman 302). Note that Genesis Rabbah gives 5% for the "butter" *qībār*. Old Sumerian texts show that it could be "poured" (*dé*) but we have to add that according to specialists this word has an administrative meaning in those texts, "to promise delivery", as opposed to "to give".¹¹

Some texts tell us that to the ghee 6, 6% of "flour (and) salt" was added - if we read the two signs correctly.¹² Digard (198) wrote that among the Bakhtiyari butter-milk, "salted and strewed with celery leaves", is a much esteemed drink. The Sumerian texts also mention some high quality kinds of ghee (*ī.nun.dūg.ga* and *ī.nun.HA*).

The Hebrew cognate *hem'ā* clearly means "butter" in Proverbs 30:33 (Held) but elsewhere "sour milk" or "ghee" is more appropriate (Caquot 950 f.). It is the first drink fit for young children after weaning (Is. 7:14–16, cf. Gruber 69). The word also appears in Ugaritic.

In the steppe or in countries without olives, *samn* is much appreciated as an oil and ointment. Both *himētum* and *samn* are glorified in Babylonian and Palestinian hymns, songs, and proverbs (Dalman 300). The Greeks and Romans looked down on the sour milk and its by-products as food of the barbarians (André 154, 159; Dalman 310).

The 85% milk left after churning is the 'butter-milk', French 'babeurre' or 'petit-lait', German 'Buttermilch' (Arabic *šanīna* in Syria; elsewhere *mḥīd*; and dialectal variants; in some dialects *leben*!). Jacobsen suggested that Sumerian *ga.ī.te.er.da*, a loan from Akkadian *itertum*, is butter-milk. This is suggested by these lines in the "bucolic" text studied by him: "She will be churning (?) my milk for me in the churn, will be beating the milk like a buffeting wind, make the butter-milk (*ga.ī.ti.ir.da*) leave the cream (*ī in.ta.g₄.e*) as were it clay" (Jacobsen 196). The Akkadian word means "surplus", i. e., what is poured off as the butter is made (thus Jacobsen 197). We have to say that the comparison with "clay" does not look very apt.¹³ "Clay" would far better apply to the floating flocks of real butter, Arabic *zubb*. At the end of this article we will suggest that *ga.NUNUZ.TE* can be butter-milk.

Ghee was an ingredient in many dishes, especially the *mirsum*, according to its Sumerian ideogram: "bread (on which) ghee was poured". Similar dishes are mentioned in the Talmud (*kūtāhā* and *kamkā*) or described in ethnographical literature (Hess 116, Dalman 308).

The "cheeses"

According to modern literature, fermented sour milk or butter-milk often is made into small round balls which are left to dry on the roofs. They become very hard and resemble chalk (Doughty, Dickson). They are named *kašk* or *kišk* in Syria, northern Mesopotamia and Iran, also *kušuk* in Syria and Iraq. We sometimes read that they are made of sour milk (Dalman 295 f., Feghali 186, Jastrow 1990, 129 § 135, 295 § 337). More often, they are said to be a product of butter-milk (Musil 145, Dalman 298 f., 301, Sweet 105, Digard, Watson). Other words are *'aqiṭ* (in Classical Arabic; Ahsan 98) or *jgiṭ* (and by-forms), *bagel* along the Euphrates and in Kuwait, etc. (Charles, Hess 115 f., Dickson - all made of sour milk). Charles Doughty, travelling through Western Arabia, noted *mereesy* as their name; in modern dialect studies *mirīs* (made of butter-milk).¹⁴ In Iraq, the Shammar tribes use the words *bakl* and *čirṭi* (Stein 62, 91 f.; plate 24 - made of sour milk). As to their outer form, they can be compared with cheese; Charles speaks of "petit fromage", Dalman of "Quarkklösse" (Dalman 298 f., 301). These "milk cakes" were widely used as reserve for times when no fresh milk was available: then, they were powderized, water was added and *leben* was available again. In an article not accessible to this writer, Iraqi *kušuk* is described as "made by mixing dried parboiled wheat grits with yoghurt and fermenting it for about a week. Kushuk can be sun-dried and ground into powder for storing. It is then re-constituted with water or milk when required for use".¹⁵

In almost every discussion on dairy products one comes across this product and we expect this "instant milk" also in the ancient texts which already attest to an "instant beer" (*dida*, *billatum*) based on a similar principle. Now, the Sumerian texts often list "large cheese" and "small cheese", a few times also abbreviated (?) into "large milk", "small milk". The "small cheese" looks like a good candidate for *kišk* but better options are perhaps the dairy products "small milk" and "large milk" (*ga.tur*, *ga.gal*). A.L. Oppenheim, followed by all other Assyriologists, assumed that "milk" in these combinations (and in *ga.gazi*) is a meaningless variant of "cheese" (*ga.ār*). An Ugaritic text indeed speaks of "three talents of milks (GA.MEŠ)"; cheeses may be meant.¹⁶

Looking now at the most extensive list of types of "cheeses" in a Forerunner (17) of the Sumerian-Akkadian dictionary, one observes that they are qualified by adding names of cereals or plants, obviously used as ingredients.¹⁷ The cereals are groats (*ar.za.na*, *níg.gal.gal.sig*, *gú.níg.ār.ra*, *níg.ār.ra*) and indeed, wheat groats can be added to the cheese *kisk* (Dalman 296, 298, Feghali 186). As to the plants, in Kuwait, the wild flower *Ashpodelus tenuifolius* (*barwaq*)¹⁸ is used in making *iqṭ* (Dickson, cf. Hess 116).¹⁹

Our last argument for identifying the ancient "cheeses" with modern *kišk* can be found in their being represented as small round balls in art, especially on cylinder seals (Collon; and earlier lit.).²⁰ They always appear in a high position which may mean that they are drying on a roof (as P. Steinkeller observed).

Already in the Archaic texts from Uruk appears a particular sign for cheese, LAK 490, the predecessor of Sumerian *ga.ār*. Deimel (1949) saw in it the goat-skin bag hung between poles used in buttering, but cheese is not the direct result of churning butter. H.J. Nissen informed us that the sign shows a "hole" in its middle which fits M. Civil's proposal, made some years ago, that these cheeses were strung on a thread running through them.²¹ In the earliest periods they were counted; later on measured in volume.²² A school text from Fara lists a rich variety of this cheese.²³

The economic use of this kind of cheese is clear to us: they served as "instant milk" in lean times. They could be stored and kept for a long time, a property that true cheese does not have. In the large-scale dairy industry of the Ur III period the manufacture of *kišk* gives sense; not that of the perishable cheese so well known to us. "True" cheese also is perishable in the Middle East; by melting and putting it in brine (Sweet 104, Watson 110) or by crumbling (Jastrow 1990, 127 § 125) one could keep it "indefinitely".

It is interesting to note now that E.R. Ellison in her unpublished dissertation "A study of diet in Mesopotamia..." (1978) arrived at the same conclusion. She distinguishes "true cheese" from our "curd-cheese", made of sour milk, and interprets the element *ār* in Sumerian *ga.ār* as "milled" (which could be correct), thinking of the sun-dried curd-cheese being "grated into a powder before use".²⁴ Dalman first (1920, 34) identified the cheeses of 1 Samuel 17:18 (*ḥ³riše ḥēḥālāb*) and 2 Samuel 17:29 (*š³fōt bāqār*) with *kišk* but later suggested true cheese (Dalman 1939, 312). True cheese, however, is *g³bīnā* in Hebrew; the only and telling passage is Job 10:10, "Didst Thou not pour me out like milk and curdle (*qāfa*) me like cheese?".

This word appears as Akkadian *gubnatum* in the archive of Aršam in Achaemenid Nippur; undoubtedly a loan from Aramaic. Quite exceptionally, this cheese was made of the milk of sheep. The thought that this Aramaic word was introduced to design sheep's cheese in particular, imposes itself. We assume that *kišk*-cheese is meant.

Cheese. True cheese is made by the clotting of milk with rennet, French 'présure', German 'Lab'. This cheese is obtained by curdling, Arabic *'aqd*, the milk (Cook 450). One easily recognizes its cognate in Akkadian *eqīdum* "cheese", an equivalent of Sumerian *ga.ār* in later texts. The word also exists in ancient Hebrew if we may interpret the geographical name *Bēt 'ēqed ḥārō'im* in 2 Kings 10:12, 14 as "Cheese House of the Herdsmen". Curdling is achieved by adding to the milk the rennet, taken from the stomach of a lamb that is only a few days old. "Rennet" is in Arabic *infāḥa* or *masā* (also in modern dialects), in Hebrew *mesō* (in Talmudic lit.). It is understandable that there is some overlap with the terminology for "animal stomach" (Hebrew *qebā*) (Krauss 135). Therefore, we can compare Hebrew or Arabic *masā* "rennet" with Akkadian *misissam*, an animal stomach, cf. Latin 'omasum'. On the other hand, there also is some confusion with "colostrum", as this actually is the milk found in the lamb's stomach (cf. Cook 459 f.). It hardly is a coincidence that in ancient Greek the words *puós* "colostrum" and *puetía* "rennet" are so similar. They refer to the same milk, in various stages. The etymology of both Greek words suggests an association with "decomposition" (cf. *puón* "pus") which could give us an explanation for that other Greek word for rennet, *támisos*: can we see in it a foreign word and connect it with Syriac *tamsūtā* "pus" (root *m³sā*)? Is *te-ma-aš-ša*, following "cheese" and *pu-ul-la-an-za* in a letter from Ugarit, pertinent?²⁵ In any case, rennet stinks: in Theocritus' description of a goat-herd, "he wore on his shoulders the tawney skin of a thick-haired shaggy goat reeking of fresh rennet" (*néas tamísoio potósdon*, Idyll VII 16; A.S.F. Gow). The goat-herd in the Lebanon keeps the rennet in his belt (Feghali 177). Rennet, if properly stored, can be preserved well till the next year (Yrttiah 161 no. 37).

Even when keeping all this in mind, one cannot discover "rennet" in the cuneiform texts. One reason may be that using rennet possibly was typical of the nomads, so despised by the Babylonian urbanites. We saw already that they did not know the use of skin bags in churning butter, either. Using rennet even may have been tabooed among them; note that in

early Jewish and Islamic law there was some reluctance in preparing cheese with rennet (Cook).

Our only hope for finding the ingredients used for curdling perhaps lies in the short section on cheese in the pharmaceutical and botanical handbook Uruanna, II 489 ff. There, we read:

[Ú GA.BA].RA	=	Ú <i>e-qí-du</i>
[Ú GA].HAR	=	ditto
[Ú] GA.HAR	=	<i>na-ga-ḥu</i>
[Ú] GA.HAB	=	ditto
Ú <i>ki-si-mu</i>	=	ditto
Ú <i>ki-si-mu</i>	=	Ú <i>ša-aṣ-bu-tú</i>
Ú <i>pi-na-ru</i>	=	ditto
Ú ditto	=	Ú <i>ka-bu-u</i>
Ú <i>pi-nàr-tú</i>	=	Ú <i>qar-rat (!)-ḥu</i>
Ú <i>pu-ug-lu</i>	=	Ú <i>ša na-de-e</i>

Before we start with an interpretation, we have to warn the reader that this handbook does not offer simple equations but that the second column often gives an alternative medication when that of the first column is not available (in medical Latin: 'succedanea').²⁶ So the two may be similar in quality, not just identical. This is especially true when we find two Akkadian words side by side.

One recognizes *eqīdu* "cheese", equated with the *ga.ār* which we have identified with modern *kišk*, a product where no rennet is used. The well known Sumerian - Akkadian dictionary, in its later three-column version (Hargud), equates *ga.ār* first with *x-ru* and then, in the third column, with [Ú]-[qí-du].²⁷ We suggest *gaba-ru* for *x-ru*, thinking of GA.BA.RA in the first line of our text.

The dictionaries do not have such a word **gabarū*. We propose to see in it the Sumerian word for "shepherd's assistant", Presargonic *gáb.ra*, later forms *ka(b).bar*, *ga.ba.ra*; Akkadian *kaparrum*. One Ur III text speaks of *ga.EZEN.DA*, lit. "shepherd boy's milk", which may be a kind of cheese.²⁸ We know that these boys made dairy products by churning.²⁹ This cheese may be *kišk*.

The "Practical Vocabulary" from Assur gives the simple equation GA.HAR = *eqīdu* (120). It is our assumption that *eqīdu* is true cheese. It follows GA.MEŠ both in the Practical Vocabulary and in the "Banquet Stela" of Assurnasirpal II (130 f.) where it is counted: "100 milks": the cheese *kišk* may be intended. In any case, *eqīdu* seems to be a word adopted into Akkadian in more recent times: it appears in the third column of the lexical text and is only in the Neo-Asyrian period attested in context.

The Chicago Assyrian Dictionary in some places avoids the confusion of two kinds of GA.HAR by reading the sign HAR in GA.HAR = *eqīdu* as KÍN. Indeed, GA.KÍN immediately makes us think of GA.KIN.AG, the Sumerogram used for "cheese" in the texts from Ugarit and Boghaz-köy, lit. "milk on which work has been done".

The following *nagaḥu* is extremely rare and, therefore, obscure. Below, we will suggest that this is an evil-smelling cheese.

Kisimmu is the milk product "given" (according to Civil: "poured") in the dispute between Dumuzi and Enkimdu; so it seems to be solid. The Old Babylonian culinary recipes

show that *kisimmu* could be "crushed" (*terūm*).³⁰ The three-column dictionary offers: *ga.kisim*₃ = *ki-si-im-mu* = *n[a-ga-ḥu]* (?). According to one possible interpretation of its Sumerogram, GA.HAB, *kisimmu* is a product with a strong smell. A literary text uses it as an invective in a line full of abusive language.³¹ *Nagaḥu* can also be used to describe an uncivilized person: "You, *Emmenthaler*, you!" Everything points to a "stinking" fresh cheese. The Sumerian milk product *ga.ki.si.im.(ma)* is attested in only two economic Ur III texts.³² During the meeting of the Sumerian Agriculture Group, M.Civil presented some evidence for connecting *kisimmu* with Akkadian *kasāmu* "to cut". This reminds us of the Greek word *schízō* "to split, separate", used in technical sense for the separation of butter-milk (*orrós*) from "the cheesy substance" (*turōdes*) (Diosc. II 70, 3-4); "split milk" (*gála schistón*) stands for curdled milk. *Mutatis mutandis*, our *kisimmu* also is curdled milk, or cheese.

Another rare word is *šaṣbutu*, a product eaten by a worm according to the Vassal Treaties of Esarhaddon, 570. This suggests true cheese, not the stone-hard *kišk*.

Pinnaru also is attested in the three-column dictionary, in the series *kisimmu* - cheese - cream - *BIR.gùn* = *pinnaru* - *ga.nunuz* = *lullubātu*. Its Sumerogram *BIR.gùn* means "coloured kidney / bead". The context shows that this "bead" must be a milk product. Is it a very small round cheese? Rennet-made cheese is named *pinar* in modern Persian (Digard, Watson). Scholars have suggested that we have this word in Old Elamite *ba-nu-ra*; we hold it for possible that ultimately *pinar* is identical - etymologically - with Akkadian *pinnaru* (by-forms *pinnartu*, *punnartu*). An unpublished text in the British Museum adduced by von Soden in his dictionary shows that it could be put to "dry".³³

Kābū means "dung" and probably refers to a stinking cheese. The next word, *pinnartu* (var. *pu-nàr-tu*), can mean either "small *pinnaru*", or "one single piece of *pinnaru*".

We will halt here for one moment, asking ourselves whether *pinnaru* and *kabū* can mean "rennet" after all. An Old Babylonian medical text and a later copy have in their prescription the line "you shall dry and crush the kidney (*BIR, kalītum*) of a small lamb that has not yet eaten grass".³⁴ Before eating grass, a lamb enjoys its mother's beestings. Now, in modern Tell Ṭoqaan (Syria) the rennet substance is made from the stomach of a lamb "that has never eaten grass", as the local people put it (Sweet 103, below). The identification of Akkadian *kalītum* with the kidney is beyond any doubt. However, the milk product *pinnaru* also is a "kidney" according to its Sumerogram: "coloured" (*BIR.gùn*). If "kidney" in the prescription just quoted means "rennet", the fact that the lamb has not eaten grass yet gets its full force. The second word that can be interpreted as rennet is *kabū*. Dung stinks and may look like rennet. Note that the word is remarkably similar to Hebrew *qebah* "stomach", and "rennet".

Qarrathu (copy *qarruḥu*) is a complete riddle.

Puglu in the last line is a well known plant, "radish" (*Raphanus*); the explanation means "plant of throwing". Has "to throw" the technical meaning "curdle"? One Sumerogram for *puglu*, GA.DIN, has the element "milk" in it. Or does "to throw" refer to diarrhoea? The other Sumerogram, ŠÀ.GI, may suggest this. Elsewhere in Uruanna it follows *šurdunū*, a plant associated with diarrhoea (Akkadian *redū š*). - Or ought we to read *buqlu*, "malt"? Note that the lexical series Diri associates *kisimmu* with malt (*MUNU₄.SAR*).

Note that *ri* in the milk products *ga.še.ri.a* (= *širpētu*) and *ga.ri.a* (Forerunner 21:15) can stand for *nadūm*.

Curdling cheese by plants is an alternative for using rennet. The earliest Greek author speaking about making true cheese (*tréphō*) is Homer: by adding "juice" (*opós*) to "the white

milk" it thickens (Iliad V 902). The Classical tradition is unanimous in identifying this juice with that of the fig. Did Homer not yet know rennet? Later authors always mention fig-juice or sprigs of the wild fig in the first place.³⁵ The Mishnah tractate Orlah, I 7, shows that fresh milk is curdled with the sap of the leaves or roots of plants, or of unripe figs; cf. Dalman 303, 312. Curdling with plants or rennet is called 'amad in Mishnaic Hebrew and the Talmud, lit. "to stand (still)".³⁶

Cheese in Mesopotamia There was much variety in cheeses in ancient Mesopotamia. The short list of obscure words in Uruanna, just given, already suggests this. The "large" and "small" cheeses of the Ur III period are indicative; add the *murub*₄ cheeses that were standard in the city of Umma. "Dodder cheese" (*ga.àr gazi*) sometimes is inserted between the large and small cheeses; it is one of the many cheeses to which flavouring ingredients have been added. They are listed in Forerunner 17 of Hh (MSL 11 161).

The process of cheese-making is nowhere described. The Lamentation over the Destruction of Sumer and Ur offers these lines (335–6):

"Those who are unfamiliar with butter (i) were churning (*dun₃dun₃*) the butter,

Those who are unfamiliar with milk were... (*mùš.mùš*) the milk".

We suggest that the second line refers to making cheese, probably *kišk*.

We now propose the hypothesis that Forerunner 15: 335–351 (MSL 11 157) gives us the subsequent stages between milk and cheese. We read: milk – milk of cows – milk of goats – milk of 'green' goats – the ferment *rawba* (*ga.LAGAB.a*) – sour milk – butter-milk (?) (*ga.NUNUZ.TE* = *uqūru*) –..... (*ga.NUNUZ.TE.ti.a*) –... (*ga.kin.gál.la* = *i-šu*) –.... (*ga.bil.la*) – coagulating milk (*ga.àm.ús*) – running milk (whey?) (*ga.àm.gin*) – cheese – large cheeses – small cheeses – dodder cheese –... cheese (*ga.àr.SIL.I*).

The milk product *ga.NUNUZ.TE* (= *uqūru*) reminds one of *ì.NUNUZ.TE*, served as a delicacy at a banquet in the epic tale Lugalbanda and Hurum 91: regular, or boiled. The herdsman Dumuzi offers it after his *itirda* (butter?). It reminds one of the Syrian *šenīna*, the refreshing "butter-milk", so much appraised (Ashkenazi 145, Rosenhouse 51, Sweet 104, Weulersse). The element NUNUZ could stand for any groats that have been added. Indeed, the three-column dictionary offers as last milk product, after *pinnaru*: *ga.NUNUZ* = *lul-lu-ba-tú* = x [...], and *lullubātu* is a pulse.

The suggestion "coagulating milk" for *ga.àm.ús* was inspired by Sumerian *ús*, Akkadian *emēdum* "to lean" (!), connecting this with Hebrew 'amad, "to stand (still)".

NOTES

- * I thank the participants to the meeting of the Sumerian Agriculture Group, Barcelona July 7–9, 1990, for their advice. I mention in particular M. Civil, W. Heimpel, M.A. Powell, P. Steinkeller and H. Waetzoldt, specialists in Sumerian, for giving me some additional references. A zest was lend to the meeting by M. Civil in presenting a paper on the same topic, but sometimes we arrived at different conclusions. We agreed on the colostrum and the cheese *kušuk* but not on "sour milk" (the two Sumerian terms identified by me were kept apart by Civil) nor on *kisimmum* which Civil considers a fluid product resulting from churning. Mrs. G. Biga showed me her manuscript on milk in the third millennium; see the Bibliography.
- 1 J.J.A. van Dijk, *La sagesse suméro-accadienne* (Leiden 1953) 68, 72 lines 100–114.
- 2 K. Butz, in WZKM 65–66 (1973–74) 37–45; *State and temple economy in the Ancient Near East, I* (= *Orientalia Lovaniensia Analecta* 5) (1979) 355 note 259; JESHO 27 (1984) 290.
- 3 The short list of words in Arabic dialects given by J. Cantineau in *Annales de l'Institut d'Etudes orientales*, III (1937) 213, "Le lait", is far from complete.
- 4 Note also A.P.G. Poyck, *Farm Studies in Iraq* (Wageningen 1962) 66, and compare Al-Maqdissi (1990) 467.
- 5 Cf. D.E. Riehm, ZAW 3 (1883) 277.
- 6 The exception is the archive of the Achaemenid prince Aršam: cheese (*gubnatu*) made of sheep's milk.
- 7 "To ferment" is in this case *htr* in Arabic (Conteneau 40; Jastrow 1981, 389 § 9, with note 8).
- 8 E. Warnock Fernea, *Guests of the Sheikh. An ethnography of an Iraqi village* (Anchor Books 1969) 67. – Cf. S. Westphal-Hellbusch, *Die Ma'dan* (1962) 94.
- 9 ASJ 7 (1985) 195. – The sequence: (vessels of) *ga.SIG₇.a* – *še.a* in ITT II 3802:5–6 (Lagaš), compared with: (quantities of) *ga.še.a* – *še.a* in MVN 14 552 (Umma), pleads for identity. Comparison of the passages SET 130:401–4, 419–421 (*ga.še.a*) and MVN 15 108 IV 5–7, TCL 5 6040 IX 7–9 (*ga.SIG₇.a*) also can serve as proof.
- 10 See also P. Damerow, R.K. Englund in H.J. Nissen, *Frühe Schrift und Techniken der Wirtschaftsverwaltung im alten Vorderen Orient* (1990) 134–144; and the discussion hidden in R.K. Englund, *Organisation und Verwaltung der Ur III-Fischerei* (1990) 43–46.
- 11 J. Bauer, AWL (1967) 327; *Frühe Schrift und Techniken* ... (1990) 138–9. – Englund (1991) 102, following M. Teuber, suggests for these texts *ì.sè.ga* "churned fat", and *ì.nun* "risen fat".
- 12 Nahakara 19:7 (1/15), SET 130:116 (coll. ASJ 8 318), Durand, *Documents cunéiformes* Pl. 49 no. 417 I 8 (1/15), 12, MVN 15 108 II 10.
- 13 Cf. M. Civil, *Aula Orientalis* 1 (1983) 50 f., who quotes another line from the same text, "The *itirda*-milk, without being river mud, has been diverted into cracks of the ground", but he reviewed his translation in Barcelona in the light of a new manuscript: "he caused the *itirda*-milk to crack even if it is not river mud".
- 14 Ch. Doughty, *Travels in Arabia Deserta* (New York 1921) I 305; Yrttiahō 152, top line; 162 no. 40; 167 s.v. *mrs.* Musil 145 gives more words.
- 15 W. Frankel, P.L. Pellett. We follow the summary given by R.E. Ellison, Diss. (1978) 185 f.
- 16 PRU 6 156:1.
- 17 MSL 11 (1974) 161 Forer. 17 VI 13 ff.
- 18 Confirmed by *Flora of Iraq* VIII (1985) 58. Nothing relevant in I. Löw, *Die Flora der Juden* II (1924) 156.

- 19 Groats, flour and plants are also an additive to other butter products (Burckhardt, Cantineau, Dalman 297 f., 299, 302, Hess 115, Jastrow 1981, 389, 391, Jastrow 1990, 128, Musil 144, Rosenhouse 53)
- 20 E. Porada, "Pottery scenes of the Agade period ?", in P.M. Price, *Pots and potters* (1984) 21–26, is of another opinion.
- 21 M. Civil, *Or. NS* 56 (1987) 233–5.
- 22 H.J. Nissen a.o., *Frühe Schrift und Techniken der Wirtschaftsverwaltung im alten Vorderen Orient* (1990) 135–7, 139.
- 23 Fara II 64.iv.13 - v.6.
- 24 Diss., p. 186. Cf. her short remark in *JESHO* 27 (1984) 94 – [see also *JNES* 51 (1992) 23:6].
- 25 S. Lackenbacher, *Studies A.W. Sjöberg* (1989) 318 f.
- 26 Already seen by B. Landsberger, *ZA* 41 (1933) 232 note 1.
- 27 E. von Weiher, *SpbtTU* III 238 no. 116 IV 8.
- 28 *BIN* 5 82:7.
- 29 A. Berlin, *Enmerkar and Ensuhkešdanna* (1979) 86.
- 30 *YOS* 11 25:19, etc.
- 31 A.W. Sjöberg, *JCS* 25 (1973) 138 ad 157.
- 32 N. Schneider, *AnOr* I 64:26; *Orientalia* 47–49 no. 403 (coll. H. Waetzoldt, *Or. Ant.* 17 50).
- 33 K. 2768:9, collated by R.M. Jas: *GIM pi-in-na-ri* UD.A.
- 34 *BAM* 4 393:2 (OB), *AMT* 85/1.ii.7–8.
- 35 Euripides, *Cyclops* 136; Aristotle, *Hist. Anim.* III 20, end, 522b; Theophrastus, *De causis Plant.* I.16.7 (its "milk"); Columella VII.8.1; Pliny, *NH* 16 181; 23 117 and 126; Diosc. I 128, 3. Cf. André 156 and Jung 41 f.
- 36 For the *qal* see J. Levy's dictionary under *masu*. Far more frequent is the causative form, virtually meaning "to make cheese". By coincidence, the Arabic word *gamada* sounds very similar.

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ZU DEN BEZEICHNUNGEN VON SCHAFEN UND ZIEGEN IN DEN DREHEM- UND UMMATEXTEN

Wolfgang Heimpel

(Berkeley)

1 Einleitung

Den hier vorgelegten Beitrag über die Bezeichnungen von Schafen und Ziegen in den Ur III Texten aus Drehem und Umma verstehe ich als einen ersten Schritt in ein mehr oder weniger unerforschtes Gebiet. Zwar gibt es inzwischen ausgezeichnete Editionen von tausenden von Texten nebst Indices, Glossaren und Wortkonkordanzen. Auch haben A. Leo Oppenheim in AOS 32 und B. Landsberger in verschiedenen Veröffentlichungen, deren wichtigste die Edition von Hh XIII in MSL VIII/1 ist, wichtige Beiträge zum Thema geliefert. Aber da von einem Verständnis der Ur III Verwaltung und ihrer Bereiche noch keine Rede sein kann, und da das Verständnis der Terminologie der Texte diesem Gesamtverständnis nicht sehr weit vorauslaufen kann, stehen wir im Grunde immer noch ganz am Anfang. Im Bereich der Weidewirtschaft kann man allerdings von der bahnbrechenden Arbeit von F.R. Kraus, *Staatliche Viehhaltung im Altbabylonischen Lande Larsa* (1966) ausgehen. Die von ihm behandelten Texte werden einfach die Kraus'schen Texte genannt.

In einigen Punkten weiche ich von der Konvention ab. Erstens lasse ich bei den Übersetzungen jede Interpunktion weg, denn ich halte es nicht für erwiesen, dass die Urkunden Sprachprodukte sind, also Sätze enthalten.

Zweitens verbinde ich Determinative und phonetische Komplemente mit dem dazugehörigen Wortzeichen durch einen Punkt.

Drittens halte ich mich an die konventionellen Abkürzungen nur dann, wenn sie kurz sind. Bei der Arbeit mit Textzitaten in Tabellen ist das unausweichlich. Die Bibliographie im *Comprehensive Catalogue of Published Ur III Tablets* von M. Sigrist und T. Gomi (1991) erlaubt es, alle Zitate leicht zu finden. Abgekürzte Publikationen, die dort noch nicht aufgenommen sind, und eine Reihe von Abkürzungen, deren Auffinden auch mit dem Catalogue schwierig sind, finden sich im Abkürzungsverzeichnis.

Viertens habe ich entgegen der Konvention guten Stils die Wortbildungskraft des Deutschen voll ausgenutzt und Monstrositäten wie den Pflanzstockgrossschwanzwidder etc. geschaffen. Dieses Vermögen der deutschen Sprache ist hervorragend geeignet, lange sumerische Wörter zu übersetzen, indem man die konstituierenden Wortstämme von hinten nach vorne aneinanderreihet.

Wo es sinnvoll schien, habe ich im Anschluss an das Textzitat das Datum und mit dem Siglum U die Herkunft aus Umma bezeichnet.

D. Snell, M. Sigrist, and P.J. Watson haben mir freundlicherweise noch nicht publizierte Texte zur Verfügung gestellt, wofür ich ihnen danke.

2 Die Grundbezeichnungen für Schafe und Ziegen

u ₈	Mutterschaf
udu	Widder
kir ₁₁	Mutterlamm
sil ₄	Bocklamm
uzud	Geiss
ašgar	Zicklein
máš	Bock und Böckchen

Das Schema beim Schaf ist klar gegliedert. Es gibt vier Wortbasen für das Binärpaar ♀ - ♂ - ausgewachsen - jung; für die Ziegen gibt es nur 3. máš bezeichnet das männliche Tier ohne Unterscheidung des Alters. Je nach Zusammenhang bedeutet das Wort Böckchen oder Bock. Vgl. z.B. den Abschnitt über Ziegen in einer Tilgung von Gross- und Kleinvieh von seiten des Statthalters von Isin PDT 1 524 Š 44 VI:

50 uzud	Geissen
135 ašgar-gub	Bestandzicklein
32 máš	Böcke
172 máš-gub	Bestandböckchen

Hier ist die Folge der weiblichen Tiere von Ausgewachsenen zu Jungen vom Wechsel des Grundwortes begleitet; bei den männlichen Tieren ist das nicht der Fall. Die Bedeutung bleibt aber eindeutig, denn nach dem Schema der Aufzählungen trennte man die ausgewachsenen von den jungen Tieren und nannte diese nach jenen. Es gab nun doch oft Gelegenheiten, die eine terminologische Unterscheidung die beiden Alterstufen erforderten. In diesem Fall erweiterte man máš mit der näheren Bezeichnung gal "gross" und bezeichnete damit den Bock, wodurch einfaches máš die Bedeutung Böckchen annahm. Vgl. z.B. die Liste des für das bal des Statthalters von Girsu bestimmten Kleinviehs in Orient 16 48 ŠS 7:

438 udu-ú	Graswidder
257 máš-gal-ú	Grasböcke
388 sil ₄ -gub	Bestandbocklämmer
143 máš-gub	Bestandböckchen

Oder man verwendete die nähere Bezeichnung šà-du₁₀ "gutes Herz" für die Böckchen und dann máš-níta, nicht einfaches máš, für die Böcke. Vgl. z. B. MCS 2 S.74 BM 105517 ŠS 4 III U, eine Liste von Ziegen, welche einem Hirten anvertraut waren:

12 uzud	12 Geisen
8 ašgar	8 Zicklein
10 máš-níta	10 Böcke
5 máš-šà-du ₁₀	5 Böckchen
si-il-la	anvertraut
šà É-dur ₅ -gú-dè-na	in Steppenuferdorf
Lugal-hi-li na-gada	Lugalhili Hüter

3 Terminologie der Summenangaben

Man fasste gerne die Tiere eines Geschlechtes ohne Rücksicht auf ihr Alter zusammen und benutzte dafür die Bezeichnung des ausgewachsenen Tieres, wobei wiederum máš eine Ausnahme bildet:

udu	+ sil ₄	= udu
Widder	+ Bocklämmer	= ♂ Schafe
u ₈	+ kir ₁₁	= u ₈
Mutterschafe	+ Mutterlämmer	= ♀ Schafe
máš-gal	+ máš	= máš
Böcke	+ Böckchen	= ♂ Ziegen
uzud	+ ašgar	= uzud
Geissen	+ Zicklein	= ♀ Ziegen

Vgl. z.B. die drei Summierungen in der Liste von Ausgaben der Zentrale CT 32 27f. AS 7 V:

ŠU+NIĜIN	Summe 2. Kategorie
13 udu-niga	gemästete Widder
1 udu-a-lum-niga	gemästeter Alumwidder
1 udu-Simaški-niga	gemästeter Simaškiwidder
1 sil ₄ -niga	gemästetes Bocklamm
2 u ₈ -a-lum-niga	gemästete Alummutterschafe
3 máš-gal-niga	gemästete Böcke
1 uzud-Simaški-niga	gemästete Simaškigeiss
1 ašgar-niga	gemästetes Zicklein
605 udu	Widder
8 udu-gukkal	Grossschwanzwidder
14 udu-a-lum	Alumwidder
10 udu-gukkal-ġiš-dù	Pflanzstockgrossschwanzwidder
6 udu-a-lum-ġiš-dù	Pflanzstockalumwidder
19 sil ₄	Bocklämmer
1 sil ₄ x	x Bocklamm
1 sil ₄ -gukkal	Grossschwanzbocklamm
24 máš-gal	Böcke
1 máš	Böckchen
1 uzud-máš-nu-a	unfruchtbare Geiss
1 ašgar	Zicklein
LAGAB-ba	Summe 3. Kategorie
680 udu	männliche Schafe
2 u ₈	weibliche Schafe
28 máš	männliche Ziegen
4 uzud	weibliche Ziegen
LAGAB.LAGAB-ba	Summe 4. Kategorie
714 udu-máš-hi-a	verschiedene Schafe und Ziegen

Die 680 männlichen Schafe rekrutieren sich aus allen **udu** "Widdern" und **sil₄** "Bocklämmern", die 28 männlichen Ziegen aus 3 **máš-gal-niga** "gemästeten Böcken", 24 **máš-gal** "(nicht gemästeten) Böcken" und 1 **máš** "Böckchen"; die 4 **uzud** weiblichen Ziegen aus 1 **uzud-Simaški-niga** "gemästeten Simaški Geiss", 1 **ašgar-niga** "gemästeten Zicklein", 1 **uzud-máš-nu-a** "unfruchtbaren Geiss" und 1 **ašgar** "(nicht gemästeten) Zicklein".

Die Zusammenfassung von weiblichen ausgewachsenen und jungen Schafen ist z.B. in der Liste königlichen Einkommens (**mu-DU lugal**) Buccellati 18 AS 5 XII bezeugt. Dort entsprechen 1 Mutterschaf, 1 Grossschwanzmutterschaf, 3 **MAŠ** Mutterlammern (**kir₁₁-MAŠ**) und 1 Alummutterlamm (**kir₁₁-a-lum**) in der Summe der 1 Kategorie (**ŠU+NÍGIN**) 6 **u₈** "Mutterschafe" in der Summe der 2. Kategorie (**ŠU+NIGIN**).

Ich kann kein Beispiel dafür finden, dass man Altersgenossen ohne Rücksicht auf das Geschlecht in einem Begriff zusammenfasste.

Schafe beider Geschlechter und Altersgruppen nannte man **udu-hi-a** und Ziegen **máš-hi-a**. Vgl. z.B. die Summen 3. Kategorie (**LAGAB+LAGAB-ba**) in MVN 618 X AS 7 U:

1074 udu-hi-a	verschiedene Schafe
180 máš-hi-a	verschiedene Ziegen

Ziegen fasste man auch als **uzud-máš-hi-a** "Geissen und Böcke" zusammen. So werden sie z.B. in der Summenangabe aller Ziegen aller Einkommensposten in der Bilanz SET 130 AS 4 U genannt (Tabelle 19).

Wenn Schafe oder Ziegen nach Art oder Hirtentätigkeit (vgl. für diesen Begriff H. Waetzoldt, *Untersuchungen zur Neusumerischen Textilindustrie* [1972] 31ff) bezeichnet werden, lässt man **hi-a** "verschiedene" gewöhnlich weg und benutzt **udu** für Schafe und **uzud**, nicht **máš**, für Ziegen (vgl. z. B. die Terminologie der Summen in der Umma Kleinvieh-zählung in Tabelle 16).

Schafe und Ziegen nannte man gewöhnlich **udu-máš-hi-a** "verschiedene Schafe und Ziegen" (siehe oben CT 30 27f.).

Selten benutzte man dafür **udu**. Vgl. z.B. MVN 13 857 U:

1 u₈ 7 uzud	1 Mutterschaf 7 Geissen
3 sil₄ 21 máš	3 Bocklämmer 21 Böckchen
udu-ġi₆	Nacht(mahl)kleinvieh

4 Abfolge

Die Texte scheiden sich danach, ob die weiblichen oder die männlichen Tiere zuerst genannt werden. Die erste Textgruppe handelt vom Weide-, die zweite vom Schlachtbetrieb. Die Regel ist bei verständlichen Zusammenhängen so unterschiedlos der Fall, dass man sie als Kriterium verwenden kann. Der Grund für den Unterschied liegt in dem allgemeingültigen Ordnungsprinzip der Reihung nach absteigendem Wert. Im Weidebetrieb sind die weiblichen Tiere als Träger des Nachwuchses von grösserem Wert, im Schlachtbetrieb ist es umgekehrt, denn hier sind die grösseren Tiere wertvoller.

Da sich Bereiche des Weide- und Schlachtbetriebes im Abgang berühren – so werden Schafe als Abgang von den Herden an das "Schafhaus" geliefert, wo sie dann gemästet wurden –, kommt es gelegentlich vor, dass beide Reihungen in verschiedenen Posten eines Textes zusammenstehen. Vgl. den ersten und dritten Posten in UCP 9/2 40:

1 u₈ 3 kir₁₁-gub	1 Mutterschaf 3 Bestandmutterlamm
2 udu-níta 4 sil₄-gub	2 Widder 4 Bestandbocklämmer

mu-DU en d.Inana
 11 **udu** 2 **u₈**
 2 **máš šu-gíd**
 é-muhaldim-šè

Einkommen En der Inana
 11 Widder 2 Mutterschafe
 2 männliche Ziegen **šu-gíd**
 für die Küche

Gemäss der Reihung nach absteigendem Wert wurden die ausgewachsenen vor den jungen Tieren genannt. Die Kombination von Geschlecht und Alterstufe ergibt zwei Sequenzen: ausgewachsene und junge Tiere eines Geschlechts vor denen des anderen Geschlechts, also bei der Anordnung weiblich vor männlich: Mutterschaf → Mutterlamm → Widder → Bocklamm. Vgl. z.B. die Summenangaben in TAD 48 AS 3:

608 u₈	Mutterschafe
7 kir₁₁	Mutterlamm
323 udu	Widder
9 sil₄	Bocklamm

Diese Anordnung ist in Drehem die Norm; in Umma dagegen nennt man beide Geschlechter der ausgewachsenen vor den jungen Tieren, also Mutterschaf → Widder → Mutterlamm → Bocklamm. Vgl. z.B. Tabelle 18.

Schafe gehen immer Ziegen voran, und zwar werden im Weidebetrieb zuerst alle Schafe aufgezählt und dann die Ziegen. Im Schlachtbetrieb kommen Schafe und Ziegen eines höheren Mastgrades vor solchen eines niedrigeren. Vgl. z.B. die Summen 2. Kategorie (**ŠU+NÍGIN**) in CT 32, 30f. AS 6 II:

6 udu-niga	gemästete Widder
1 máš-niga	gemästetes Böckchen
23 udu	Widder
1 u₈	Mutterschaf
2 máš	Böckchen

5 Nähere Bezeichnungen

(a) **níta** "männlich"

Diese Bezeichnung ist unerwartet, denn die männlichen Schafe und Ziegen bezeichnete man mit Wörtern eigener Wortbasen. Damit ist **udu-níta** wörtlich ein "männlicher Widder", eine Tautologie, die einer Erklärung bedarf.

níta begegnet vornehmlich im Weidebetrieb. In der Gesamtabrechnung der Hirten sumerischer Schafe in Umma MVN 13 618 AS 7 z.B. werden Widder und Bocklämmer im Kontrast mit Mutterschafen und Mutterlammern so bezeichnet (Tabelle 17). In den Summenangaben fasst man diese vier Gruppen als **udu** zusammen. Damit ergibt sich ein Kontrast **udu-níta** ↔ **udu**, also Widder ↔ Schaf. Ein paralleler Kontrast **sil₄** ↔ **sil₄-níta** ist schwer zu finden. Vgl. immerhin die Tiere der Tilgung ausständiger Schafe in SET 30 (Einkommensposten 7):

20 udu-níta-bar-ġál	20 Vollfließwidder
30 sil₄	30 Bocklämmer
ki Ur-ġiš.gigir-ta	von Urgigir
31 u₈	31 Mutterschafe
30 udu-níta	30 Widder

6 kir ₁₁	6 Mutterlämmer
6 sila ₄ -níta	6 Bocklämmer
ki Ka ₃ .a-mu-ta	von Kamu

Die Suche nach einem guten Grund für die unterschiedliche Bezeichnung der Bocklämmer führt hier zu Schwierigkeiten. Man kann zwar annehmen, dass die 30 sila₄ Lämmer beider Geschlechter waren und gewinnt damit das schöne Schema

udu Schaf	↔	udu-níta Widder
sila ₄ Lamm	↔	sila ₄ -níta Bocklamm

Aber schon die Tatsache, dass neben den 30 sila₄ 20 Widder stehen und kein Mutterschaf, weist daraufhin, dass die Tilgung des Urgigir aus uns unbekanntem Grund nur männliche Tiere betraf. Ich kann nur einen Fall dafür finden, dass man sila₄ auch für Mutterlämmer verwendete, und zwar in der der Bestandsaufnahme des Kleinviehs der Provinz Umma YOS 4 237 ŠS 7 II (Tabelle 16). Dort werden die Geschlechter der Jungtiere nicht terminologisch sondern durch ihre Stellung bezeichnet.

Die Bezeichnung máš-níta wird auch im Kontrast zum ausgewachsenen weiblichen Tier gebraucht. Vgl. dazu die Einnahmen von Ziegen des 11. Postens in SET 130 (Tabelle 19). Weiterhin benutzte man máš-níta im Alterskontrast Bock ↔ Böckchen (vgl. wieder YOS 4 237 Tabelle 16).

Im Schlachtbetrieb fehlt die nähere Bezeichnung weitgehend. In MVN 13 830 ŠS 2 III und PDT 1 406 ŠS 2 VI kommt unter Fall “in Ur” 2 bzw. 1 máš-níta-gab vor. Die nähere Bezeichnung gab “Brust” ist auf den Schlachtbetrieb beschränkt. Eine breitere Untersuchung des Gebrauches von níta ist notwendig.

(b) ga “Milch”

So wurden neugeborene Schafe und Ziegen bezeichnet. Das geht aus Drehemtexten hervor, in welchen Milchjunge unter der Rubrik ù-tu-da “Wurf” zusammengefasst werden. Vgl. z.B. die Summenangaben in CST 151:

7 sila ₄ -ga	Milchbocklämmer
12 kir ₁₁ -ga	Milchmutterlämmer
5 máš-ga	Milchböckchen
11 ašgar-ga	Milchzicklein
ù-tu-da	Wurf
ki Na-LUL	Ort Na-LUL

Auch die beim Wurf gestorbenen Tiere wurden als Milchtiere bezeichnet. Vgl. z.B. SACT 1 91:

1 máš-ga-má-gan	1 Makkanmilchböckchen
ba-úš šà ù-tu-da	Fall beim Wurf

Ohne die in diesem Zusammenhang entbehrliche Bezeichnung “Milch”, das Wort šà und in anderer Reihung wird es in Umma geschrieben. Vgl. z.B. die Fallurkunde Peat JCS 48:

1 sila ₄ ù-tu-da ba-úš	1 Bocklamm Wurf Fall
ki Ur-ru-ta	von Urru
dub A-kal-la	Tafel des Akala

Die obere Altersgrenze der Milchstufe oder die untere Altersgrenze der darauffolgenden Alterstufe ist den Texten nicht leicht abzulesen. Einigermassen klar ist nur, dass die Bezeichnung der folgenden Altersstufe an das Wort für das Jungtier angehängt wird. Das legt nahe, dass diese zweite Altersstufe zum Jungtieralter gehörte. Wenn wir davon ausgehen, dass Milchjunge saugende Jungtiere und die nicht mit “Milch” näher bezeichneten Jungtiere entwöhnt sind, würde uns der in den Staatsherden übliche Zeitpunkt der Entwöhnung weiterhelfen. Dafür gibt es aber keine Quellen. Wir können nur allgemein feststellen, dass Schafmilchprodukte in Ur III Texten nicht vorkommen. Wenn man den Mutterschafen das Entwöhnen überliess, fand es normalerweise im 5. Monat nach der Geburt statt. Es ist allerdings denkbar, dass die Hirten Schafmilch nutzten und dann auch selbst entwöhnten, ohne dass dies von der Behörde, deren Texte wir vor uns haben, erfasst wurde. Ziegenmilch wurde zur Herstellung von 1/3 Liter Butter und 1/2 Liter Käse pro Geiss pro Jahr benutzt (vgl. z.B. AUCT 2 391). Dementsprechend wurden Ziegenjungen vom Hirten entwöhnt. Wann dies geschah, ist nicht bekannt. Aber auch wenn wir den Zeitpunkt der Entwöhnung kennen, könnten wir immer noch nicht auf die Länge der mit “Milch” bezeichneten Alterstufe schliessen, denn wir müssen damit rechnen, dass die in der Verwaltung benutzte Terminologie den Bedürfnissen dieser Verwaltung angepasst war. Vgl. etwa den Begriff “Milchkalb” für das Kalb im ersten vollen Lebensjahr (I. Gelb JCS 21 [1967] 66).

In den Listen der Texte aus dem Schlachtbetrieb stehen die Milchjungtiere gemäss ihrem Wert zuletzt. Zahlenmässig machen sie den geringsten Teil aus (vgl. Tabelle 14). Milchbocklämmer sind die Meisten der Wenigen, dann kommen Milchmutterlämmer und – in beträchtlichem Abstand – Milchböckchen und Milchzicklein. Milchbocklämmer wurden den Göttern geopfert (vgl. z.B. die Tabelle SACT 1 188 von Powell in OA 20 [1981] 133). Sie werden weiter als königliche Speise genannt. Vgl. z.B. TRU 288:

1 sila ₄ -ga	1 Milchbocklamm
ki-lugal-šè ku ₄ -ra	zum Königsort hineingebracht
nin Unu.ki-ta DU.NI	die von Uruk kommende Herrin

In ähnlichem Zusammenhang wird oft die Zubereitungsweise angegeben. Vgl. z.B. TRU 327:

1 sila ₄ -ga	1 Milchbocklamm
ne-mur-ta ba-šèg ₆	(irgendwie zubereitet)
ki-lugal-šè ba-an-ku ₄	zum Königsort hineingebracht

Milchjungtiere kommen oft in den Fallurkunden aus Drehem vor. Diese Urkunden ordnen männlich vor weiblich. Sie gehören also nicht in die Weidewirtschaft.

Vgl. z.B. den Abschnitt über Milchjungtiere in PDT 2 1165:

1 sila ₄ -ga-gi ₆	schwarzes Milchbocklamm
2 sila ₄ -ga-Simaški	Simaškimilchbocklämmer
1 sila ₄ -ga-gukkal	Grossschwanzmilchbocklamm
3 kir ₁₁ -ga	Milchmutterlämmer
1 kir ₁₁ -ga-Simaški	Simaškimilchmutterlamm
1 máš-ga-Simaški	Simaškimilchböckchen
1 máš-ga-babbar	weisses Milchböckchen
1 ašgar<-ga>-babbar-Simaški	weisses Simaškimilchzicklein
ba-úš u ₄ -4-kam	Fall Tag 4

In den Texten der Weidewirtschaft kommen Milchjungtiere nicht vor, denn wie in den Kraus’schen Texten kümmerte sich der Staat nur um diejenigen Tiere, die in ihrem zweiten

Lebensjahr zum ersten Mal zur Bestandaufnahme von der Weide kommen.

Eine Bemerkung zur Lammsaison: Die Wurfurkunden sind oft auf den Monat datiert und in Tabelle 3 zusammengestellt, weil man hoffen kann, in ihnen Information über die Verteilung der Geburten auf das Jahr zu finden. Ganz allgemein fällt auf, dass sie sich in den letzten 5 Monaten des Jahres häufen. Viel mehr kann man ohne eingehende Analyse nicht sagen. Es ist nämlich nicht einmal klar, ob die verzeichneten Tiere alle verschiedene Individuen sind, die am Tag des Datums der Urkunde geboren waren, oder ob sie den Bestand an diesem Tag darstellen, wobei sich unter ihnen solche befanden, die heute, gestern oder vor Kurzem geboren, aber noch nicht weitergeleitet waren. Vgl. z.B. die auf 8 Tage des 11 Monats AS 1 datierten Texte. Der darin genannte Wurf verteilt sich wie folgt:

Tag	♂	♀	♂	♀
5	2			2
8	20	8	4	3
13	11	10	2	2
14	10	1-	2	1
18	11	10	2	2
21	6	1	1	1
22	7		11	3
23	11	10	5	3

Sind hier 11 Bocklämmer, 10 Mutterlämmer, 2 Böckchen und 2 Zicklein am 13 geboren worden, und dann zufällig wieder ebensoviel minus 1 Bocklamm und 1 Zicklein am nächsten Tag, oder ist der am 14 registrierte Wurf die an der Stelle der Registrierung vorhandene Anzahl des noch nicht weitergeleiteten Wurfs, dessen Tiere vor Kurzem geboren worden waren?

(c) **gaba** "Brust"

Die Lesung **gaba** geht auf die akkadische Entsprechung *immer irti* "Widder/Schaf der Brust" zurück (Hh XIII 84). Dieser Eintrag widerspricht der Terminologie der Ur III Texte, wo **gaba** nur Jungtiere bezeichnet. Die Bedeutungen des Wortstammes **du** passen aber so schlecht in den Zusammenhang, dass wir auch ohne den lexikalischen Eintrag auf **gaba** verwiesen werden. Ich schlage vor, das Wort mit der Wendung **máš gaba tab** zu verbinden. J. Van Dijk hat sie sprachlich als "das Böckchen vor der Brust Halten" gedeutet (SGL 2 [1960] 153). Damit kann man Darstellungen verbinden, in denen eine Person, vermutlich der Herrscher, ein Böckchen oder ein Lamm an seine Brust gepresst darbringt. Vgl. z.B. A. Parrot, *Sumer*, Abb.294, 297; A. Moortgat, *Die Kunst des alten Mesopotamien*, Abb. 129; E. Strommenger, *Fünf Jahrtausende Mesopotamien* Abb. 184 und 227. Vgl. auch die unten zitierte Stelle aus einer Šulgihymne. Das junge Lamm oder Zicklein kann man gut so halten. Das fast ausgewachsene oder ausgewachsene Tier ist zu schwer dafür. "Brust"-Kälber gab es daher auch nicht. Ein einzelstehender Beleg **dür-GABA** aus Lagaš (MVN 2 84) enthält wohl ein anderes Wort.

Der Begriff gehört ausschliesslich zum Schlachtbetrieb und bezeichnet das nicht gemästete Jungtier, das der Milchstufe entwachsen ist. Man findet es typischerweise neben den nicht gemästeten Ausgewachsenen der Graskategorie. Vgl. z.B. Orient 16 48, eine Ausgabe von Kleinvieh an den Statthalter von Ĝirsu "für das **bal**":

438 udu-ú	Graswidder
257 máš-gal-ú	Grasböcke
388 sila₄-gaba	Brustbocklämmer

163 **máš-gaba**

Brustböckchen

In den Šusuma Texten bildet die Bruststufe die 8. Qualität, der über 9% der Tiere angehörten. Text 1 lässt die Bezeichnung "Brust" weg. Damit stellt sich die Frage, ob es im Schlachtbetrieb überhaupt einen Unterschied zwischen einem Brustjungtier und einem nicht weiter bezeichneten Jungtier gab.

Mir sind nur zwei Texte bekannt, in denen Brustjungtiere neben nicht qualifizierten Jungtieren vorkommen. (1) TRU 20 besteht aus einer Liste von Posten von Kleinviehgruppen. Eine Sequenz von drei Posten lautet:

8 máš-gal dub K[A	8 Böcke Tafel des PN
3 máš-gaba Lú-d.E[N	3 Brustböckchen PN
2 máš dub A-h[u	2 Böckchen Tafel des PN

Es ist möglich, dass hier die diesen Einträgen entsprechenden Einzeltafeln die der Milchstufe entwachsenen Jungtiere entweder speziell Brustjungtiere nannten, oder – wie in Šusuma Text 1 – diese nicht näher bezeichneten.

(2) Ein Posten aus dem Einkommen des Königs (**mu-DU lugal**) in TCL 2 4683 lautet:

3 sila₄ 2 máš	3 Bocklämmer 2 Böckchen
1 máš-gaba u₄ 15-kam	1 Brustböckchen Tag 15

Es gab auf den Tag datierte Einzelurkunden mit Eingängen von Kleinvieh unter dem Titel Einkommen (**mu-DU**), die aus Tieren verschiedener Personen bestand (vgl. T. Maeda, ASJ 11 [1989] 93 unten). Es ist möglich, dass der zitierte Eintrag eine Mehrzahl solcher Eingänge eines einzigen Tages zusammenfasste, sodass der Unterschied zwischen Böckchen und Brustböckchen wieder eine terminologische Variante sein kann.

Die Šusuma Texte verwenden für Jungtiere neben den näheren Bezeichnungen "Milch" und "Brust" noch "gemästet". Milchjungtiere werden nicht "gemästet" genannt, wohl weil sie nicht gemästet wurden. Den genauen Zeitpunkt des Beginns der Mast kennen wir nicht. Wir wissen auch nicht, ob ein gemästetes Jungtier immer ein Brustjungtier gewesen war, oder ob die Jungtiere mit dem Ende der Milchstufe in nicht gemästete Brustjungtiere und gemästete Jungtiere eingeteilt wurden. Ich halte die zweite Möglichkeit für wahrscheinlicher. Erstens werden die Brustjungtiere typischerweise neben Grasausgewachsenen verzeichnet (vgl. das oben gegebene Beispiel Orient 16 48) und zweitens spricht die Tatasche, dass Zicklein die höchste Maststufe erreichen, für eine rapide Mästung ohne Zeit für eine Bruststufe.

Wir kommen also zu dem Ergebnis, dass das Jungtierdasein im Schlachtbetrieb in zwei Alterstufen aufgeteilt wurde:

1. Stufe	Milchjungtier
2. Stufe	Brustjungtier Jungtier gemästetes Jungtier

(d) **AŠ.UR₄** "Erstrauf"

Dieser Begriff bringt uns in den Zusammenhang des Weidebetriebes, dem allein er angehört.

Kraus erkannte (Viehhaltung 23), dass das allgemein "**ur₄**" gelesene Zeichen **AŠ.UR₄** oder **AŠ+UR₄** "am Anfang einen Wagerechten aufweist". In den Ur III Texten sind die Bestandteile **AŠ** und **UR₄** noch zwei distinkte Zeichen, die gelegentlich von der Zeilengrenze getrennt wurden (SAKF 4 und MVN 13 618 "VIII" 11). In den von Kraus behandelten Texten wurde daraus eine Ligatur, und in der Schreiberschule von Nippur identifizierte man diese mit dem ähnlichen Zeichen **uzud** "Ziege", "by means of a most perplexing confusion" (Landsberger MSL 8/1 37). In

den Texten aus Nuzi taucht der Begriff als 1-en **baqnu** "eins geschoren" wieder auf (vgl. Morrison, *Studies on the Civilization and Culture of Nuzi and the Hurrians* [1981] 272). Es gab ausserdem "1 x und 2 x" (so AHw. s.v. *gazzu*) geschorene Ziegen.

Kraus zeigte, dass das Erstraufamm seiner Texte ein Jungschaf im zweiten Lebensjahr war, welches anlässlich seiner ersten Raufe und seinem damit verbundenen ersten Auftreten in den Staatsbüchern so genannt wurde.

Der Begriff wird in Drehem und Umma selten benutzt. In Drehem kommt er in BIN 3 350 Š 47 IX vor, einer Quittung des Urkununa über den Erhalt von Kleinvieh von Lulubu (**udu Lu-lu-bu**) und Kleinvieh von Sumer (**udu Ki-en-gi**). Es bestand aus:

371 u₈	Mutterschafen
64 kir₁₁-AŠ.UR₄	Erstraufmutterlämmern
137 udu	Widdern
96 sila₄-AŠ.UR₄	Erstraufbocklämmern
105 uzud	Ziegen
11 ašgar-gub	Bestandzicklein
99 máš-níta	Böcken
19 máš-gub	Bestandböckchen

Auf den Abschnitt über die Ziegen kommen wir unter **gub** "Bestand" zurück. Die Terminologie der Schafe entspricht genau den Kraus'schen Texten. Seine Herde Nr. 4B z.B. bestand aus:

201 u₈	Mutterschafen
57 kir₁₁-AŠ.UR₄	Erstraufmutterlämmern
171 udu-níta	Widdern
57 sila₄-AŠ.UR₄	Erstraufbocklämmern

Für Umma vgl. z.B. MVN 13 618 (Tabelle 17): im Bestand der 7 Hirten, deren Abrechnungen vollständig erhalten sind, gab es diegleichen 4 Kategorien, nur dass die nähere Bezeichnung "Erstrauf" weggelassen wurde – sie war ja auch im Zusammenhang entbehrlich – und man die Ausgewachsenen beider Geschlechter vor die Jungen beider Geschlechter stellte. In den Summenangaben des Bestandes desselben Textes (vgl. Tabelle 18) finden wir den Begriff für eine sehr kleine Gruppe und in Verbindung mit der näheren Bezeichnung "Vollvlies". Diese Summenangaben ordnen jeder der vier Kategorien eine Vollvliesvariante zu.

Mutterschafe	Vollvliesmutterschafe
Widder	Vollvlieswidder
Mutterlämmer	Vollvlieserstraufmutterlämmer
Bocklämmer	Vollvlieserstraufbocklämmer

Die Vollvlieslämmer werden hier dazu noch "Erstrauf" genannt. Damit wird scheinbar eine weitere Kategorie eingeführt. Sie passt aber nicht in das Schema, denn den Vollvlieserstraufämmern stehen keine Vollvlieslämmer gegenüber. Wenn es nicht ein geradezu wunderbarer Zufall will, dass ausgerechnet alle Erstraufämmern ein volles Vlies hatten und alle Lämmer ohne volles Vlies nicht Erstraufämmern waren, dann ist die Bezeichnung Erstrauf hier redundant.

Erstraufschafe kommen zweimal in den Fallurkunden aus Umma vor. In Atiqot 4 19 Š 36 XIII ist es ein Erstraufwidder (**udu-níta-AŠ.UR₄**), in SAKF 4 Š 48 X ein Erstraufmutterlamm.

2 Erstraufwidder (**udu-níta-AŠ.UR₄**) und 6 Erstraufmutterschafe (**udu-SAL-AŠ.UR₄**) stehen in DC 223 Š 43 VIII am Anfang einer Liste mit ungewöhnlicher Kleinviehterminologie.

In Drehem ist der Begriff auch ganz selten. Vgl. neben dem oben genannten Text noch **udu-AŠ.UR₄** "Erstraufwidder" in PIOL 19 154 Š 41 IX.

(e) **gub** "Bestand"

N. Postgate hat festgestellt (Some Old Babylonian Shepherds and their Flocks, JSS 20 [1975] 13f), dass die so qualifizierten "Lämmer" in spät-aB Hütverträgen mit den Erstraufämmern der Kraus'schen Texte bedeutungsgleich sind, also Jungtiere im zweiten Lebensjahr zum Zeitpunkt ihrer ersten Raufe. Ich vermute, dass das Wort **gub** "Bestand" den Inhalt dieser Bezeichnung wiedergibt, denn die zu ihrer ersten Raufe kommenden Tiere werden gleichzeitig zum ersten Mal im Bestand gezählt.

In den Ur III Texten kommt die Bezeichnung nur in Drehem Texten vor. Der oben bereits zitierte Text BIN 3 350 kontrastiert Erstraufämmern mit Beständböckchen und -zicklein. Da Ziegenhaar nicht gerauft wurde, konnte man sie natürlich nicht Erstraufziegen nennen. Man hätte sie wie in Nuzi Erstschorziegen nennen können, tat das aber nicht.

In MVN 13 874 (Tabelle 4) wird die nähere Bezeichnung "Bestand" auch für Schafe gebraucht, womit sie sachlich dasselbe ausdrückt wie "Erstrauf" in BIN 3 350. In jenem Text werden die Bestandjungtiere mit den Ausgewachsenen unter der Bezeichnung der Ausgewachsenen zusammengezählt. Demgegenüber zählte man Milchjunge und nicht näher bezeichnete Junge unter der Bezeichnung für Jungtiere zusammen. Das volle Schema ist bei männlichen Schafen enthalten:

Widder	+ Bestandbocklamm	= Widder
Bocklamm	+ Milchbocklamm	= Bocklämmer

Eine weitere terminologische Variante dergleichen Tierkategorien ist in YOS 4 237 ŠS 7 (Tabelle 16) erhalten.

Die vier Tierkategorien sind die für Bestandsaufnahmen typischen Ausgewachsenen und im zweiten Jahr stenden "Jungen". Die "Jungen" werden mit "Bestand" näher bezeichnet. Ihr Geschlecht wird hier ausnahmsweise nur durch die Stellung differenziert. Die Bezeichnungen lauten:

u₈	Mutterschafe
sila₄-gub	Bestandbocklämmer
udu-níta	Widder
sila₄-gub	Bestandmutterlämmer
uzud	Geissen
máš-gub	Bestandzicklein
máš-níta	Böcke
máš-gub	Bestandböckchen

Wenn der Begriff "Bestandjungtier" eine Altersstufe bezeichnet, stellt sich die Frage nach der unteren und oberen Grenze. Die obere Grenze ist vermutlich die Aufnahme in den Bestand. Denn es ist nicht wahrscheinlich, dass man die bereits voll ausgewachsenen Tiere weiter unter der Jungtierbezeichnung führte.

Die späteste Zeitpunkt ist in der Bezeichnung **sila₄-gub-bar-su-ga** Leervliesbestandbocklamm in TCNSD 72 belegt. Ein solches Bocklamm war bereits gerauft, und stand damit in der kurzen Zeitspanne zwischen Raufe und Niederschrift der Bestandsaufnahme.

Im Zusammenhang der Bestandsaufnahmen waren die Bestandtiere mehr als ein Jahr alt. Unter den Wurfurkunden findet sich ein Text, der demonstriert, dass Bestandtiere jünger als ein Jahr sein konnten. PIOL 19 157 lautet:

3 áb-amar-ga	3 Milchkuhkälber
3 gu ₄ -amar-ga	3 Milchstierkälber
ġir Lugal-hé-ġál	Fuss Lugalheġal
1 gu ₄ -amar-ga	1 Milchstierkalb
ġir Á-na-na	Fuss Anana
4 kir ₁₁ -gub	4 Bestandmutterlämmer
4 sila ₄ -gub	4 Bestandbocklämmer
ġir d.Utu-ma-an-sum	Fuss Utumansum Summen
ù-tu-da ki Na-ša ₆	Geburt Ort Naša
iti á-ki-ti-ta	vom 6 Monat
iti ezen-d.Nin-a-zu-šè	zum 5 Monat
iti 12-kam	12 Monate Š 45

Die Bestandlämmer waren während der 12 Monate des mit dem Akiti beginnenden Jahres Š 45 (cf. M. Cooper, ZA 77 [1987] 180) geboren worden, hatten die Milchstufe durchlebt und waren zum Zeitpunkt der Abfassung des Textes Bestandlämmer. Sie standen also noch nicht im zweiten Lebensjahr.

Bestandjungtiere werden öfters direkt nach Milchjungtieren genannt. Vgl. die Quittung des Naša über den Erhalt von Einkommen (mu-DU) PDT 1 524 Š 44 VI. Sie enthält folgende Liste:

Mutterschafe	884
Bestandmutterlämmer	394
Milchmutterlämmer	25
Widder	537
Bestandbocklämmer	490
Milchbocklämmer	25
Geissen	50
Bestandzicklein	135
Böcke (máš)	32
Bestandböckchen	172

CT 32 44a AS 2 III, eine Quittung des Šu-Erra über den Erhalt von Vieh von der Zentrale enthält folgende Liste (die Rinder sind weggelassen):

Widder	510
Milchbocklämmer	8
Mutterschafe	141
Milchmutterlämmer	8
Böcke	300
Bestandböckchen	191
Milchböckchen	87
Ziegen	759
Bestandzicklein	191
Milchzicklein	86

Wenn die Bestandstufe der Milchstufe direkt folgte, teilte man im Weidebetrieb die Spanne von der Geburt bis zur Aufnahme in den Bestand im zweiten Lebensjahr in 2 Altersstufen. Aufgrund der Terminologie im Schlachtbetrieb, wo die wesentlich kürzere Spanne des ersten vollen Lebensjahres in zwei Stufen eingeteilt wird, hätte man eher eine Dreiteilung erwartet. Bei meiner Suche nach Belegen für eine dritte Stufe stiess ich nur auf die folgende Liste aus MVN 5 117 AS 4 V, einer Quittung des Intaea über den Erhalt von Kleinvieh von der Zentrale:

18	Mutterschafe šu-gíd
1	Bestandmutterlamm šu-gíd
2	Widder šu-gíd
1	Bocklamm šu-gíd
6	Bestandbocklämmer šu-gíd
4	Ziegen šu-gíd
5	Bestandzicklein šu-gíd
1	Bock (máš-níta) šu-gíd

Dem einen Bocklamm kann ich aber auch nicht viel Gewicht beimessen. Es erscheint in der Liste am falschen Platz, indem es die Widder von den ihnen näher stehenden Bestandbocklämmern trennt.

Wenn es richtig ist, dass die Abfolge Milchstufe ↔ Bestandstufe Schafe und Ziegen von der Geburt bis zur Erfassung im Bestand im zweiten Lebensjahr vollständig beschreibt, folgt, dass nicht näher bezeichnete Jungtiere im Gegensatz zu Milchjungtieren im Weidebetrieb immer speziell Bestandtiere waren.

Die Umma Texte kommen ohne den Begriff aus. Sie bezeichnen die entsprechenden Tiere einfach als Jungtiere.

(f) bar-ġál “Vollvlies” und bar-su-ga “Leervlies”

A. Deimel übersetzte bar-ġál “ungeschoren” und bar-su-ga “geschoren” (ŠL 74 224). Oppenheim meinte, dass diese Übersetzungen nicht für die Ur III Texte passten, denn “animals of both kinds are listed side by side” (AOS 32 [1948] Anm. 94). Landsberger verwendete wieder Deimels Übersetzungen, nur dass er “geschoren” mit “gerauft” ersetzte. Er wies darauf hin, dass das Wort bar-su-ga in der aB Zeit von “bar-sù-a” abgelöst und mit buqūnu übersetzt wurde (MSL 8/1 14). Kraus fand bar-ġál als nähere Bezeichnung von Lämmern in der staatlichen Viehhaltung von aB Larsa. Er zeigte, dass sie wie die Erstraufklärer keine Lämmer waren, sondern in ihrem zweiten Lebensjahr standen, aber bei ihrem ersten Antreten nicht mit dem Gros der Gleichaltrigen gerauft wurden (Viehhaltung [1966] 27ff). Postgate meinte dagegen “these are the summer lambs which were not yet old enough to be shorn” (JSS 20 [1975] 13).

Kraus nahm auch zu der Verwendung in den Ur III Texten Stellung. Er wies auf zwei Belege (YOS 4 246 und TAD 51) hin, die – so meinte er – Angaben über von bar-ġál Schafen gewonnene Wolle enthalten, ein Unding, wenn bar-ġál Schafe ungerupft waren. Waetzoldt kehrte zur Übersetzung “ungerauft” zurück. Er zeigte, dass bar – wie man bereits vermutet hatte – “Vlies” bedeutet, und er besprach die Gesamtheit der mit bar zusammengesetzten näheren Bezeichnungen für Schafe in den Ur III Texten (UNT [1972] 39). Er sah in dem Element su-ga das Wort “zurückgegeben” und schlug unter Berufung auf Nikolski 371 eine neue Bestimmung vor: “Schafe, deren Wolle nach festgelegter Zeit und in festgelegter Menge (genau 2 Minen) von den Hirten abgeliefert werden musste” (l.c. 29). Tatsächlich kann su-ga kaum “gerauft” heissen, denn das Wort ist bereits vergeben (ur₄). P. Steinkeller sieht in su-ga eine syllabische Schreibung des Wortes sù(g)=erû “nackt”, rīqu “leer”. Dem folge ich und übersetzte das Paar bar-ġál und

bar-su-ga als "Voll- und Leervlies".

Die Begriffe kommen im Weidebetrieb in den Umma Texten häufig vor. Ich bin mir bewusst, dass ich sie nicht voll verstehe, und kann nur einige Beobachtungen machen, und zwar, dass (1) ein bei der letzten Raufe gerauftes Schaf ein Leervlies- und ein bei dieser nicht gerauftes Schaf ein Vollvliesschaf sein konnte, dass (2) gefallene DU.DU Schafe mit leerem und gefallene Herrschaftsschafe mit vollem Vlies abgeliefert wurden, und dass (3) Schafe, deren Vlieszustand nicht näher bezeichnet wurde, Vollvliesschafe, aber nicht Leervliesschafe waren.

(1) Einer der zwei von Kraus für die Bedeutung von bar-ġál zitierten Texte ist YOS 4 246, eine nach den zwölf Monaten eines Jahres aufgeteilte Liste von Stiftungen. Diese bestehen aus Tieren, Standarten (šu-nir), Dolchklingen (eme-ġir), einem "entführten Kind" dumu-kar-ra und ŠEN-al-lul. Die Summierung lautet:

šuniġin 38 šu-nir	Summe 38 Standarten
udu-bar-ġál-bi 6-àm	die Vollvliesschafe sind 6
udu-bar-su-ga-bi 32	die Leervliesschafe 32
máš-bi 38	die Böckchen 38
síg-bi 38 ma-na	die Wolle 38 Pfund
šuniġin 2 eme-ġir	Summe 2 Dolchklingen
udu-bar-su-ga-bi 2	die Leervliesschafe 2
síg-bi 2 ma-na	die Wolle 2 Pfund
šuniġin 1 dumu-kar-ra	Summe 1 "weggenommenes Kind"
udu-bar-su-ga-bi 1	das Leervliesschaf 1
síg-bi 1	die Wolle 1
šuniġin 2 ŠEN-al-lul	Summe 2 ŠEN-al-lul
udu-bar-ġál-bi 1	Das Vollfliesschaf 1
udu-bar-su-ga-bi 1	das Leervliesschaf 1

Die Tiere und die Wolle wurden bei den einzelnen Posten nicht verzeichnet. Ein Einzelposten einer Standarte zum Beispiel lautete einfach:

1 šu-nir	1 Standarte
PN	(gestiftet von) PN

Standarten, Dolchklingen, Kinder und ŠEN-al-lul waren also nur der namengebende Teil einer Stiftung, die auch Tiere und Wolle einschloss. In Zeile "44" finden wir nach dem Namen des 7. Monats das Wort "Leervlies". Damit wurde offensichtlich ausgedrückt, dass der 7. Monat die Grenze zwischen Leervlies und Vollvliesschafen war. Dabei muss die Grenze am Beginn des 7. Monats liegen, denn mit den ŠEN-al-lul Stiftungen war ein Leervlies und ein Vollvliesschaf verbunden. Da der Text nur zwei dieser Stiftungen enthält, und da eines in den dritten Monat und damit in den Bereichs der Vollvliesschafe fällt, muss die Stiftung im 7. Monat ein Leervliesschaf enthalten haben. Die 32 Leervliesschafe der Summierung kann man nur im zweiten Halbjahr unterbringen. Der Befund ist in der folgenden Tabelle zusammengestellt:

	Vollvliesschafe						Leervliesschafe						
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Standarten	[]	1+		[]	1+	1	1	1+	3	5+	7+	9+	
Dolchklingen											2		
dumu-kar-ra									1				
ŠEN-al-lul				1			1						

Die Regelung, im ersten Halbjahr nur Vollvliesschafe und im zweiten Leervliesschafe zuzulassen, wird sinnvoll, wenn man den Wert der Wolle auf dem Schaf betrachtet. Unmittelbar nach der Raufe ist er null und steigt dann bis auf seinen Höhepunkt bei der nächsten Raufe. Bei den Stiftungen, die mit einem Schaf verbunden waren, glich man die jahreszeitlichen Wertschwankungen grob aus, indem man verlangte, dass Schafe im ersten Halbjahr bei der letzten Raufe nicht gerauft worden waren, sodass ihr Vlies "voll" war. Im zweiten Halbjahr erlaubte man bei der letzten Raufe geraufte Schafe, da ihr Vlies inzwischen wenigstens ein halbes Jahr alt war.

Die eigentliche Bedeutung "Leervlies" ist hier gewissermassen auf den Kopf gestellt, denn die Leervliesschafe des Textes haben ein über 6 Monate langes Vlies.

(2) Der Fall in MVN 13 618 besteht ausschliesslich aus Vollvliesschafen. Da Schafe das ganze Jahr hindurch starben, müssen auch die bei der letzten Raufe gerauften Tiere dabei sein. Das heisst, dass die in (1) gegebene Bedeutung in diesem Zusammenhang nicht zutrifft. Mit der Exklusivität der gefallenen Vollvliesschafe kontrastiert SACT 2 249 "AS 6", wo der Fall ausschliesslich aus Leervliesschafen besteht. Gleichzeitig identifiziert die Textunterschrift mit dem Begriff udu-DU.DU die Hirtentätigkeit, also das Übereinkommen zwischen Staat und Hirten, derzufolge die Lieferung des Falls erfolgte. Die Hirten in MVN 13 618 dagegen waren Herrschaftshirten (sipa-nam-en-na), wie aus zahlreichen Texten hervorgeht. Vgl. z.B. den Abgang aus den Herden der überwiegend gleichnamigen Hirten für bal und Schafhaus in GDD 348, wo diese ausdrücklich als sipa-nam-en-na-ke₄-ne Herrschaftshirten bezeichnet werden. Es liegt nahe, dass der Unterschied zwischen Leervlies- und Vollvliesfall in den verschiedenen Hirtentätigkeiten begründet ist: die Herrschaftshirten lieferten ihren Fall im Vollvlieszustand, die DU.DU Hirten im Leervlieszustand.

MVN 13 618 und SACT 2 249 sind Jahrestexte, enthalten also vermutlich den Fall, der sich während aller Monate des Jahres ansammelte. Es hätte also Voll- und Leervliesschafe zu jeder Jahreszeit gegeben. Wenn wir nun aus den auf den Monat datierten Fallurkunden diejenigen herausuchen, die die Schafe mit Leer- oder Vollvlies näher bezeichnen, erhalten wir folgende Verteilung:

Monat	Vollvlies	Leervlies
V		1
VI	1	1
VII	7	1
VIII	2	5
IX	8	
X	1	
XI	3	
XII	1	10
XIII		1

Das Fehlen der 4 ersten Monate des Jahres ist wohl nicht Resultat eines Überlieferungzufalls.

(3) SET 130, die "Bilanz des Uree über Kleinvieh, Fett und Haar" (nīg-kas₇-ak udu ì síg), also die Produkte der ihm unterstehenden Herden, das sind die Tempelherden mit Ausnahme derjenigen des Šara von Umma, fasst die Schafe des Einkommens und der Ausgaben unter den Begriffen Vollvliesschafe (udu-bar-ġál), Leervliesschafe (udu-bar-su-ga) und Vollvliesslämmer (sila₄-bar-ġál) zusammen (Tabelle 19). Die einzelnen Posten benutzten eine Vielzahl von Bezeichnungen, darunter auch solche, bei denen der Vlieszustand unbezeichnet bleibt. Im einzelnen gilt: die 50 Leervliesmutterchafe und 91 Leervlieswidder (udu-níta-bar-ġál) in Einnahmeposten 9 sind die

einzigsten Leervliesschafe aller Einnahmeposten und ergeben die – doppelt umrandete – Summe von 141 Leervliesschafen (**udu-bar-ġál**). Die restlichen ausgewachsenen Schafe der Einnahmeposten, also Mutterschafe, Vollvliesmutterschafe, Widder und Vollvlieswidder machen die 1850 Vollvliesschafe (**udu-bar-ġál**) der Summenangabe aus. Unter den Lämmern der Einnahme finden sich keine Leervlieslämmer. Die Summe der 312 Vollvlieslämmer setzt sich aus Mutterlämmern, Bocklämmern und Vollvliesbocklämmern zusammen.

Im Ausgabeteil sind die 105 Vollvlieslämmer (**sila₄-bar-ġál**) der Summe die Vollvlieslämmer der Ausgabeposten 4, 5 und 10 usw.

Dieser Befund bedeutet, dass nach Vlieszustand unbezeichnete Schafe im Zusammenhang des Textes Vollvliesschafe waren. Das ist vielleicht nur das Resultat des Blickwinkels vom Zeitpunkt der Niederschrift der Tafel am Jahresende. Die individuellen Schafe können zum Zeitpunkt ihrer Registrierung als Einnahme oder Ausgabe anders bezeichnet gewesen sind.

(g) **ġiš-dù** "Pflanzstock"

Landsberger bestimmt dieses Wort als Bezeichnung für unkastrierte Tiere aufgrund der Gleichungen **gu₄-ġiš-dù-a** = *mīru* "Zuchtbulle" (AfO 10 [1935] 153f.) und **udu-nita-ġiš-dù-a** = *immeru ša ana rakābi uššuru* "ram which is set free for mounting" (Hh XIII 8; dazu MSL 8/1 67f). Die Schreibung **ġiš** steht sicher für **ġiš** Penis; das Wort **dù** "ein Junges im Muttertier pflanzen" ist in der Bezeichnung **u₄/uzud-sila₄-máš-dù-a** "Mutterschaf/Geiss mit gepflanztem Lamm/Böckchen" = "trächtig" (siehe unten) bezeugt.

Die Bezeichnung kommt in Texten der Weidewirtschaft meines Wissens nicht vor.

In Texten des Schlachtbetriebes finden wir ihn in Umma selten. Vgl. z.B. AUCT 1 182, eine kleine Bilanz von Kleinvieh, welches für Opfer bestimmt war. Vom Befehlshaber (**šabra**) kamen:

4 udu-nita	4 Widder
3 udu-ġiš-dù	3 Pflanzstockwidder
2 u₄ 2 sila₄-gaba	2 Mutterschafe 2 Brustbocklämmer

In Drehem dagegen kommen Pflanzstockwidder und -böcke häufig vor. Sie waren für Opfer und Zeremonien bestimmt. Vgl. z.B. BIN 3 173 AS 8 IX:

1 udu-ġiš-dù-niga	1 gemästeter Pflanzstockwidder
1 máš-gal-ġiš-dù-niga	1 gemästeter Pflanzstockbock
ga-kú-še	für das Käse Essen
d.En-lil-zi-ša-ġál maškim	Aufpasser Enlilzišaġal
ša Nibru.ki	in Nippur

Pflanzstockwidder und -böcke kommen in den Šusuma Texten in kleinen Zahlen vor (vgl. Tabelle Pflanzstockwidder und -böcke in den Šusuma Texten). Sie rangieren nach dem Grassvieh. Vgl. Text 4 42–46:

1017 udu-ú	Graswidder
788 máš-gal	Böcke
9 udu-ġiš-dù	Pflanzstockwidder
7 máš-ġiš-dù	Pflanzstockböcke

Wo sie selbst Grasvieh sind, rangieren sie ebenfalls an unterster Stelle der männlichen Grastiere, vgl. Text 8 IV 4–6:

336 máš-gal-ú	Grasböcke
26 máš-gal Simaški-ú	Grassimaškiböcke

4 **máš-gal-ġiš-dù-ú**

Graspflanzstockböcke

Šusuma Text 1 zählt eine Anzahl von Pflanzstocktieren verschiedener Arten auf, sodass man den Eindruck eines regelrechten Zuchtprogramms bekommen kann (Tabelle 7). Dieser Eindruck verstärkt sich, wenn wir die Artbezeichnungen des Pflanzstockviehs, welches von der Zentrale verteilt wurde, betrachten (Tabelle 5 und 6).

Besonders auffällig sind die relativ hohen Zahlen der Grossschwanzwidder. Eines dieser Zuchttiere wurde nach TCNSD 342 mit Mast bei Kräften gehalten, bis es an Altersschwäche starb:

1 udu-gukkal-ġiš-dù-niga	1 gemästeter Grossschwanzpflanzstockwidder
1 uzud Simaški	1 Simaški Geiss
ša libir	an Alter
1 máš-ga-a-dara₄	1 Steinbocksamenmilchböckchen
ša ù-tu-da	bei der Geburt
ba-úš u₄-18-kam	verendet Tag 18

Pflanzstockkleinvieh dieser und weiterer Arten begehen in Texten, in denen Uta-mišaram den Erhalt von Kleinvieh verschiedener Arten quittiert. Tabelle 12 fasst die Angaben der 4 umfangreichsten dieser Texte (CST 295 AS 4 V-XII, PDT 1 345 AS 8 IV oder V, AUCT 1 301 AS 8 IX und St Or 9 26 desselben Datums) zusammen.

Aus dem Rahmen dieser mässigen Zahlen fallen die **máš-ġiš-dù** in JCS 14 15. Dieser Text ist in Tabelle 9 wiedergegeben. Mit seinen runden Zahlen stellt er wohl einen Überschlag dar. Aus Beständen der bei den genannten Orten stationierten Herden sollte das **bal** des Statthalters von Sippar bestritten werden. Unter den insgesamt 2860 Tieren waren 480 **máš-ġiš-dù**, wobei **máš** Böcke oder Böcke und Böckchen bezeichnet.

(h) **kin-gi₄-a** "Botschaft"

Oppenheim wies daraufhin, dass **uzu-kin-gi₄-a** mit *amūtu* "Orakelleber" geglichen ist und meinte, dass die so bezeichneten Bocklämmer – er übersetzt sie ungenau als messenger lambs – und Schafe vielleicht für die Eingeweideschau bestimmt waren (AOS 32 zu C 5). Im Nippur Vorläufer von Hh XIII werden **máš-kin-gi₄-a** (152) und **udu-kin-gi₄-a** (154) genannt. In der kanonischen Version fehlen die Einträge, sodass wir keine akkadische Übersetzung haben. Die Texte aus Umma und Drehem sprechen nicht klar für die zunächst sehr plausible Idee von Oppenheim. Es werden z.B. keine Botschaftböckchen genannt, obwohl doch das Böckchen das typische Tier für die Eingeweideschau war. Das geht schon aus dem Namen des Haruspex **máš-šu-gíd-gíd** und auch den Kontextbelegen hervor. Vgl. z.B. Gudea Zylinder A XII 16–17:

máš-babbar-ra šu mu-gíd-dè	Er untersucht ein weisses Böckchen
máš-a šu ì-gíd máš-a-ni ì-ša₆	Er untersuchte das Böckchen: sein Böckchen war gut

Einmal werden Botschaftsbocklämmer tatsächlich im Zusammenhang mit einem Haruspex genannt. Der Text (MVN 4 262 Š 43 II 10) lautet:

2 udu 1 sila₄	2 Widder 1 Bocklamm
Ur-ša₆-ga sukkal	Wezir Uršaga
1 amar maš-dà Bu-bu	1 Gazellen junges Bubu
7 sila₄	7 Bocklämmer
sila₄-kin-gi₄-a-didli	einzelne Botschaftbocklämmer
ki l'-sú-a-ri-ik	von dem Haruspex

máš-šu-gíd-gíd-ta
mu-DU

Issu-arik
Einkommen

Wenn die Botschaftbocklämmer Schlachttiere waren, die speziell für die Eingeweideschau bestimmt waren, erwartet man, dass der Hasuspex sie empfang.

Der Begriff wird ausschliesslich für Bocklämmer, Widder und "Bocklammwidder" (*udu-sila*) der nicht qualifizierten Art gebraucht. Es handelt sich also um männliche einheimische Schafe.

Die Bedeutung der drei Bezeichnungen überschneidet sich. Sie kommen in keinem Text zusammen vor. Vielmehr benutzte man in ein und demselben Zusammenhang selten "Botschaftwidder" oder "Botschaftbocklammwidder" und gewöhnlich "Botschaftbocklamm". Vgl. zwei Beispiele der Opfertexte des *bal*, und zwar TCL 2 5482 IS VII:

10 *udu-kin-gi*-a
Lú-ša-lim maškim
udu Urí.ki-ma

10 Botschaftwidder
Aufpasser Lu-šalim
Widder von Ur

mit TCL 2 5514 IS 2 X 3:

7 *sila*-kin-gi-a
Bēlum-d.Adad maškim
ša Urí.ki-ma

7 Botschaftbocklämmer
Aufpasser Bēlum-Adad
in Ur

Die Botschaftbocklämmer können ausgewachsene Tiere sein, wie aus ihrer Gruppierung mit ausgewachsenen Tieren in Listen hervorgeht. Vgl. z.B. die Abfolge in TCL 2 4691 ŠS 9 VI, einer Liste von Einkommen, welches als *bal* des Statthalters von Ešnuna bestimmt war, und zwar:

4 *udu-niga*
38 *sila*-kin-gi-a
117 *udu*
221 *u*
11 *máš-gal*
88 *uzud*
281 *sila*
139 *máš-gub*
20 *ašgar*

gemästete Widder
Botschaftbocklämmer
Widder
Mutterschafe
Böcke
Geissen
Bocklämmer
Bestandböckchen
Zicklein

In BIN 3 586 vom 23. desselben Monats (und Jahres) kam eine Gruppe von 3 dieser Botschaftbocklämmer unter den Aufpasser Lu-šalim. Sie wurden in diesem Text "Botschaftbocklammwidder" genannt.

Botschaftbocklämmer waren aber nicht immer ausgewachsene Tiere. In JCS 14 14 ŠS 1 IX wird ein Botschaftbocklamm in der Summierung mit den anderen Bocklämmern zusammengezählt, und in BIN 3 76 werden 10 Botschaftbocklämmer nach 4 Bocklämmern genannt.

Wo man den Textzusammenhang definieren kann, erscheinen Botschaftschafe in Verbindung mit dem *bal*. In Umma werden sie in Schafmasstexten mit der Unterschrift "Futter für gemästete Widder des *bal*" (*ša-gal udu-niga bal-a*) genannt, nicht aber in den beiden anderen Arten von Schafmasstexten, also denjenigen, die entweder die Schafmast für die Versorgung (*sá-du*) der Götter der Provinz oder die Mast der "gut gemästeten Widder" (*udu-niga-sig*) zum Gegenstand haben (für die ersten beiden Gruppen vgl. J.-M. Durand und D. Charpin, *Remarques sur l'élevage intensif dans l'Iraq ancien, L'archéologie de l'Iraq* [1980] 139f.). Die Texte in der ersten Gruppe

sind in Tabelle 22 zusammengestellt. Die Botschaftbocklämmer erhalten 1/3, 1/2 oder 2/3 Liter Gerste pro Tag, in jedem Fall weniger als die gemästeten Widder (*udu-niga*).

In Drehem kommen die Botschaftschafe in den Texten vor, die Ausgaben aus dem *bal* aufzählen. Eine einigermaßen geschlossene Gruppe ist in Tabelle 8 zusammengestellt. Botschaftbocklämmer waren jeden Tag unter den Ausgaben. Oft waren es 5, aber auch mehr bis zu 11 und weniger bis zu 3 (am 28 in Text 3). Die Bestimmung der Tiere ist nicht direkt genannt. Vielmehr werden sie verschiedenen Personen wie Lu-šalim, Suen-bāni und Bēlum-Adad als Aufpassern (*maškim*) zugeordnet. In Text 1 und 5 gehören die Botschaftbocklämmer in den Abschnitt "in Ur". Texte 2 und 9 enthalten die Abschnitte "in Nippur" und "in Drehem". Die Botschaftbocklämmer gehören in den Abschnitt "in Drehem". Vgl. Text 2:

5 *sila*-kin-gi-a
d.Suen-ba-ni *maškim*
[] *sila ga-še-a*
sá-du ur-gi
[ki] *A-mur-Ilum*
ša Puzriš-d.Da-gan

5 Botschaftbocklämmer
Aufpasser Suen-bāni
[] Liter še-a Käse
Hundeversorgung
[Ort] Amur-Ilum
in Drehem

Wir können den Texten also entnehmen, dass die Botschaftbocklämmer für Ur oder Drehem, aber nicht für Nippur bestimmt waren.

In zwei Texten werden Botschaftbocklämmer auf einem "Königboot" (*má-lugal*) lokalisiert, und zwar in Nikolski 461 AS 7 IX, wo dieses Boot in Kontrast zu dem "Küchenboot" (*má-muhaldim*) und in PDT 1 347 AS 8 XI (einer "Bilanz von Alšarraki"), wo es in Kontrast zu dem *UZ-ga*-Boot steht.

(i) *u/uzud-sila/máš-nu/nú-a* "unfruchtbares Mutterschaf, unfruchtbare Geiss"

Oppenheim schlug im Kommentar zu AOS 32 H 13 "sheep big with lamb" vor, was er von der mutmasslichen Bedeutung "belegen" von *nú* ableitete. Landsberger übernahm diese Ansicht und ersetzte die umständliche Übersetzung mit einfacherem "pregnant" (MSL 8/1 27 zu Teile 190ff). Er bemerkte, dass das Element *nú* gelegentlich mit dem einfacheren Zeichen *nu* geschrieben wurde. Eine Durchsicht der mir bekannten Belege ergibt, dass dies gegen Ende des Jahres AS 3 geschah. Strikt ist die Grenze allerdings nicht: PIOL 19 4 schreibt bereits im Jahr Š 48 *nu* und RA 79 8 noch am Ende des Jahres AS 5 *nú*. Einen parallelen Fall, die Ersetzung von *TUR* durch *TU* hat P.J. Watson notiert (CCTB 1 S. 81ff). Die Ersetzung des komplizierten Zeichens *nú* durch das einfache Zeichen *nu* war eine sicher willkommene graphische Vereinfachung. Die Schreibung *nú* erscheint nur sinnvoll, wenn man *nú* "liegen" wiedergeben wollte, denn warum sollte man die umständliche Schreibung *nú* benutzen, wenn man einfaches *nu* meinte? Die Bedeutung *nu-a* "ohne" (es ist eine aus Verbalaffixen ohne Verbalwurzel gebildete Form wie *hé-a*) passt aber besser zu der Funktion der Tiere als Schlachtvieh, denn es ist plausibel, dass man "Mutterschafe-ohne-Lamm" und "Geissen-ohne-Böckchen", also unfruchtbare Mutterschafe und Geissen, verzehrte, und wenig plausibel, dass man trüchtige Mutterschafe und Geissen schlachtete. Ich nehme daher an, dass etymologisches *nu* in Drehem aus unerfindlichen Gründen bis AS 3 mit dem komplizierten Zeichen *nú* geschrieben wurde.

Die Bezeichnungen kommen in den Ummatexten nicht vor. In den Drehemtexten begegnen sie oft in den Texten über Einkommen (*mu-DU*) und Ausgaben des *bal*. In den Tagestexten der ersten Gruppe sind es normalerweise 1 oder 2 (z.B. in TRU 118), ausnahmsweise mehr (z.B. 4 unfruchtbare Geissen von PN1 und 5 von PN2 in MVN 13 507), in den Monatstexten liegen die Zahlen entsprechend höher (z.B. 16 unfruchtbare Geissen in Riedel 1 und 22 plus 1 unfruchtbares Mutterschaf in BIN 3 495). Auch in den Texten mit Ausgaben des *bal* sind die Zahlen mässig

(z.B. 17 unfruchtbare Ziegen in AnOr 1 16 und 16 in MVN 3 344). Wie diese Beispiele bereits zeigen, sind die unfruchtbaren Geissen zahlreicher als die unfruchtbaren Mutterschafe. In 77 Texten der beiden Arten zähle ich 163 Ziegen und 112 Schafe.

Nicht selten sind sie gemästet (z.B. 1 gemästete unfruchtbare Geiss in UDT 107 und 1 gemästetes unfruchtbares Mutterschaf in TRU 28), wobei nun die Schafe überwiegen. Ich zähle 4 Ziegen und 8 Schafe. Einen höheren Mastgrad erreichen sie nicht.

Die Bestimmung ist oft das Haus UZ-ga (z.B. CT 32 10f) und seltener die Küche (é-muhaldim, z.B. AUCT 1 20). In SACT 1 188 waren sie ausschliesslich für die Versorgung des Königs (sá-du₁₁ lugal) bestimmt. Für diesen Zweck wurden täglich ein bis zwei unfruchtbare Geissen, einmal auch ein unfruchtbares Mutterschaf bereitgestellt (vgl. die Tabelle von Powell). Den Göttern wurden sie nicht geopfert.

(j) u₈/uzud-sila₄/máš-dù-a "trächtiges Mutterschaf, trächtige Geiss"

Oppenheim wies in seinem Kommentar zu AOS 32 B 1 auf den Nippurtext BE 3 79 hin, wo sich der Eintrag 2 áb-amar-dù-a 3 áb-amar-nú-a findet. Damit ist die Eigenständigkeit der beiden Bezeichnungen etabliert und der leicht aufkommende Verdacht beseitigt, dass dú Fehler für nu oder umgekehrt ist. Oppenheim übersetzte "ewe which has already ewed" und "goat which has already kidded". Landsberger setzte sich anlässlich Hh XIII 191 mit der lexikalischen Überlieferung auseinander. Sie hatte dù mit du ersetzt und daraus ein "Mutterschaf, dessen Lamm geht" gemacht. Er übersetzte gegen diesen gelehrten Unsinn "with newborn lamb". Tatsächlich zeigen zwei der spärlichen Belege, dass ein u₈-sila₄-dù-a oder ein uzud-máš-dù-a als zwei Tiere zählten. In dem oben am Ende der Bemerkungen über "Pflanzstock" bereits genannten Texte JCS 14 15 (Tabelle 9) ist die Summe 2860. Das sind 400 mehr als die Summe der Einzelposten. Die Rechnung geht erst auf, wenn man annimmt, dass die Tiere der Klasse u₈/uzud-sila₄/máš-dù-a doppelt gezählt wurden.

Der Ummatext DC 223 Š 43 VIII enthält eine Aufstellung von Kleinvieh in der "Hürde des Lugalemahe". Der Schreiber bediente sich einer sonst unbekannten Kleinviehterminologie. Die Vorderseite lautet:

2 udu-níta-AŠ.UR ₄	2 Erstrauwidder
8 udu-SAL-AS.UR ₄	8 ErstrauMutterschafe
1 udu-níta-gal	1 Grosswidder
16 u ₈ -sila ₄ -níta-dù-a	16 trächtige Mutterschafe
12 u ₈ -udu-saĝ	12 'Hauptwiddermutterschafe'
šuniĝin 39 udu-hi-a	Summe 39 verschiedene Schafe
šuniĝin 16 sila ₄ -níta	Summe 16 Bocklämmer

Die 16 Bocklämmer der Summe müssen in den 16 trächtigen Mutterschafen enthalten sein. Zweifellos produzierten nicht alle trächtigen Schafe ein Lamm, denn das Mutterschaf wirft oft zwei Lämmer; andererseits starben viele Lämmer bei der Geburt. Das eine Lamm pro trächtigem Mutterschaf oder trächtiger Geiss war also erwarteter Durchschnitt.

Ich kenne nur 3 weitere Belege für den Begriff. Aus Umma stammen zwei Testamente, die neben einer Eselstute und Sklaven ein trächtiges Mutterschaf (MCS 2 S.74 BM 105360), bzw. neben einem Saatpflugochsen und Sklaven eine Anzahl von trächtigen Mutterschafen und Geissen enthalten. Der dritte Beleg findet sich in dem Drehemtext AUCT 1 426 AS 6 XI (=CT 32 10f I 8-21): 10 Böcke wurden "für ein einziges trächtiges Mutterschaf eingebracht" (mu u₈-sila₄-dù-a diš-àm ì-in-ku₄-ra-šè).

6 Artbezeichnungen

Bei der Darstellung der Kleinvieharten ist der Kontrast zwischen den Drehem- und Ummatexten besonders scharf. In der Provinz treffen wir auf das einheimische Kleinvieh, in Drehem auf eine Mischung von einheimischem und ausländischem Kleinvieh.

Es ist den Herausgebern von Drehemtexten immer schon aufgefallen, dass eine ganze Reihe von Tierarten und Artbezeichnungen (Spezies und subspecies) nur oder überwiegend in Drehem vorkommen. Unter dem Kleinvieh sind das die Simaški Arten aus dem Osttigrisraum, die als Beutegut oder Abgabe nach Drehem kamen; die Lulum Schafe, die Steinkeller mit dem ebenfalls osttigrischen Lullubu in Verbindung bringt; die Alum Schafe, die von Amoritern geliefert wurden; die Mufflons und Steinböcke aus den Gebirgen und deren Mischlinge mit Hausschafen und -ziegen, die sogenannten Mufflonsamenschafe und Steinbocksamenziegen; schliesslich eine Reihe von seltenen Arten unbekannter Herkunft.

In der Provinz sieht der Kleinviehbestand nach Art ganz anders aus. Zwar kommen in Lagaš die Lulum Schafe und in Umma die Alumschafe gelegentlich vor, aber sonst trifft man in den beiden Provinzen nur auf das sumerische und das Grossschwanzschaf.

Im Folgenden wird nicht versucht, die Kleinvieharten systematisch und vollständig zu behandeln. Vielmehr greife ich vier Aspekte heraus, und zwar (1) eine Episode des Einfließens von Kleinvieh aus Simaški, (2) einige Texte und Textstellen zum Zuchtbetrieb, (3) die Identität des Landschaftes der Ummatexte mit dem Grossschwanzschaf, und (4) die Verbindung von schwarzen Schafen und der Göttin Inana.

(1) Die Simaški Arten

Eine Gruppe von Ausgaben der Zentrale unter Abbašaga an die Beamten Intaea, Šulgiaaĝu und Na-LUL und die Statthalter von Ġirsu und Kiš des Datums AS 4 VIII bezieht sich zur Hauptsache auf Vieh aus der Beute von Šašrum (=vielleicht Šemšara) und Šuruthum. Die Zahlen für das Kleinvieh sind in Tabelle 10 zusammengestellt. Die meisten Schafe und Ziegen wurden mit der Artbezeichnung Simaški versehen. Hieraus ergibt sich, dass Šašrum und Šuruthum zu Simaški gehörte und dass das dort vorkommende Kleinvieh von den in Babylonien einheimischen Arten klar unterschieden war.

Die Simaški Schafe und Ziegen wurden oft weiter nach Haar- bzw. Wollfarbe bezeichnet, und zwar schwarz (gi₆) und braun (si₄) oder mit der Farbmusterbezeichnung ĝun-a "bunt".

Die nach Farbe unbezeichneten Simaški Schafe und Ziegen müssen die Farbe gehabt haben, die nicht genannt wird, also weiss. Das ist für Schafe zu erwarten, nicht aber für Ziegen, denn in Babylonien war die Normalziege schwarz. Bei den spärlichen Angaben über die Wolle, bzw. das Haar der Tiere bleibt unklar, ob z.B. ein "braunes" Schaf rein braun war oder vielleicht nur einen braunen Kopf hatte. Soviel ist klar: die Verwaltung in Drehem teilte sie sorglich in die Farbskala ein. In den in Tafel 10 zusammengestellten Daten machen sie folgende Prozente unter den 4511 Schafen und Ziegen aus (die 111 Jungtiere sind nicht berücksichtigt):

	Schafe	Ziegen
(weiss)	36.28	34.17
schwarz	46.15	15.67
braun	6.92	44.87
bunt	10.64	5.29

Neben den Simaški Arten waren in der Beute aus Šašrum und Šuruthum 14% nach Art unbezeichnete Schafe und Ziegen enthalten. In der Terminologie von Drehem und Umma liess man die sumerischen Schafe und alle Ziegen nach Art unbezeichnet. Die Nichtbezeichnung der

erbeuteten Schafe und Ziegen bedeutet also vermutlich, dass sie den babylonischen Arten entsprachen.

Auch im folgenden Jahr kam Simaški Kleinvieh in grosser Fülle, diesmal nicht als Beute, sondern als "Einkommen" (**mu-DU**) aus Simaški nach Drehem. Die Zentrale unter Abbašaga gab zum Datum AS 5 VI 5 die folgenden Simaški Tiere aus (Text 1=MVN 1 141; Text 2=MVN 13 904; die Bezeichnung Simaški im Text ist hier der Kürze halber weggelassen):

	1	2
schwarze Widder	91	56
schwarze Muttertiere	130	45
Widder	79	155
Mutterschafe	229	135
Bocklämmer	60	30
Mutterlämmer	131	30
Geissen	30 ¹	50
Milchbocklämmer	2	

Zum Datum 5 VIII 10 waren es:

Text	Empfänger	W	M	B	G
OLP 10	Šu-Erra			540	238
PDT 1 96	Intaea	144	54	463	215
BIN 3 108	Statthalter Šarakam	24	66		

Das sind zusammen 1461 Schafe und 1536 Ziegen. Den weiteren Weg der Tiere kann man gelegentlich verfolgen. Zum Beispiel wurden Simaški Schafe und Ziegen aus dem von **Me-ta-nu-nu** gelieferten Einkommen für Opfer, einen Botschafter und andere Zwecke bestimmt (MVN 1 142 AS 5 VIII). Nach den in PDT 2 602 Š 47 V zusammengefassten Hirtenabrechnungen wurden sie auch in die Herden eingegliedert. In den einzelnen Hirtenabrechnungen des Textes wird der Anfangsbestand des gerade vollendeten Jahres und die danach erfolgten Aufstockungen dem Abgang und Fall gegenübergestellt und so der neue Anfangsbestand ermittelt. Unter den Posten der Aufstockung findet sich Beutegut, und zwar insgesamt 1200 Schafe und Ziegen Simaškibeute und 360 Ziegen Amoriterlandbeute. Nach der Abrechnung des Hirten Šuniannam (Tabelle 11) hatte dieser nach der Abrechnung des vorangegangenen Jahres einen Bestand von 371 "Zicklein" und 104 **máš** "Böckchen". Dazu hatte er 1165 Ziegen aus verschiedenen Quellen als Aufstockung erhalten. 410 dieser Ziegen waren Beutegut, 300 aus Simaški und 110 aus dem Amoriterland. Die Verteilung der gesamten 1200 Tiere aus der Simaškibeute war wie folgt:

Hirt	kir ₁₁	udu	ašgar	máš
Šuniannam			293	7
Urlugal	227	32	38	3
Uralla	228	32	38	2
Irišum	227	33	39	2

(2) Nicht sumerische Schafe und ausländische Ziegen im Zuchtbetrieb

Unter den Empfängern von Pflazstockkleinvieh kommt in den späteren Jahren von AS oft ein gewisser Ūta-mīšaram vor (vgl. Tabelle 5). Er ist mit Texten verbunden, die hauptsächlich nicht-sumerische Schaf- und Ziegenarten verzeichnen. Diese Texte sind Quittungen, die geringe Zahlen von Kleinvieh und die Namen des Lieferanten und des Empfängers enthalten. Sie verraten

nicht, woher die Tiere ursprünglich kamen und wofür sie bestimmt waren. Ein typischer Text ist AUCT 1 6 AS 8 II:

1 ašgar-a-dara ₄	1 Steinbocksamenzicklein
u ₄ 5-kam	Tag 5
ki Lugal-amar-kù-ta	von Lugalamarku
Ū-da-mi-ša-ra-am	Ūta-mīšaram
ì-dab ₅	erhielt's

In Tafel 12 sind die Arten und Zahlen der vier längsten Texte dieser Art zusammengestellt. Es sind dies CST 295 AS 4 V-XII, BIN 3 539 AS 5 II, PDT 345 AS 8 IV oder V und StOr 9 26 AS 8 IX, bzw. die zweite Ausfertigung AUCT 1 301. Sie ordnen männlich vor weiblich, aber man zögert, sie einfach dem Schlachtbetrieb zuzuordnen, denn hier könnte auch der Zuchtbereich vorliegen, in dem das männliche Tier dem weiblichen ebenfalls im Wert vorausging.

Für die Kleinvieharten in den Šusuma Texten vgl. vorerst Tabelle 13.

Eine Notiz zu einer Art: Das **en-zi** Schaf kommt in der Beschreibung des opferbeladenen Šulgi bei seiner Ankunft am Kai von Kulaba vor (J. Klein, Šulgi X 5-7).

am-gal-hur-sağ-ğa á il-il-la-da
udu-en-zi-dè šu-a lá-a-da
máš-si₄ máš-za-lá gab-a tab-ba-da

Das heisst etwa:

"mit einem grossen Ur an der Seite,
einem **en-zi** Widder bei der Hand,
einem braunen Böckchen, einem bärtigen Böckchen vor der Brust"

Ure und braune Böckchen waren keine besonders wertvollen Opfertiere. Beide rangieren in den Listen weit hinter den gut gemästeten (**niga-sig₇**) Stieren (**gu₄**), Widdern und Böckchen. Sie – und damit auch der **en-zi** Widder – waren also eher eine Seltenheit und deswegen als königliche Opfer geeignet.

(3) Das Landschaft in Umma

Was man in Umma "Landschaf" **udu-kur-ra** nannte, hiess in Drehem "Grossschwanzschaf" **udu-gukkal**. Das ergibt sich aus YOS 4 237, einer Bestandsaufnahme des Kleinviehbestandes der Provinz Umma durch die übergeordnete Behörde – vertreten durch Lubau und Šurzi – aus Anlass der Ablösung des Statthalters Ajakala durch seinen Nachfolger Dadaga. Der in Tabelle 15 formalisierte Text enthält die Names der Hirten und die Anzahl und Art der von ihnen betreuten Schafe und Ziegen. Die Schafe werden nach der Art als Grossschwanz, schwarz oder sumerisch bezeichnet, die Ziegen nach der Art des Abkommens zwischen Hirt und Staat als Herrschafts- oder **ga-za-PI** Ziegen. Die so charakterisierten Schaf- und Ziegenarten werden weiter mit Tempeln in der Provinz und mit Aufsehern in Beziehung gesetzt.

Der Šara und Ninura Tempel hatte Grossschwanz- und sumerische Schafe; die unter dem Aufseher Urnungal und ohne Tempelaffiliation stehenden Schafe waren ausschliesslich Grossschwanzschafe; die Inana Tempel hatten ausschliesslich schwarze Schafe. In Umma ist die Bezeichnung **udu-gukkal** so selten, dass ihr Auftreten in YOS 4 237 mit der Tatsache verbunden werden muss, dass die Bestandsaufnahme nicht unter Regie der Provinz, sondern von übergeordneter Stelle vorgenommen wurde. Diese Stelle benutzte die ausserhalb Ummas benutzte Bezeichnung Grossschwanzschaf. TJA FM 48 ist eine zweite Bestandsaufnahme aus dem 8 Monat desselben Jahres. Gezählt sind hier die beim Dorf Ašalamah lokalisierten Landschaft (**udu-kur-ra si-il-la šà É-dur₅-a-ša-lá-mah**). Die drei Hirten dieser Landschaft sind identisch mit Hirten der

Grossschwanzschafe des vorigen Textes. Die Zahlen sind in Tabelle 15 in den Reihen "FM 48" eingetragen. Offenbar handelte es sich um dieselben – nach 5 Monaten durch Fall und Abgang leicht verminderten – Herden. In der Liste des im Jahr ŠS 5 gefallenen Kleinviehs der Provinz (T. Gomi, Orient 20 17ff) finden wir die meisten Hirten wieder. In diesem Text werden sie als Hirten sumerischer Schafe (*sipa-udu-eme-gi-ra*) und Hirten von Landschaften (*sipa-udu-kur-ra*) bezeichnet. Dabei sind viele Hirten der Landschaft mit Hirten der Grossschwanzschafe in der Kleinviehzählung YOS 4 237 identisch. In der Tabelle sind die in beiden Texten vorkommenden Namen mit einem Stern gekennzeichnet. Landschaft war also der in Umma übliche Name der sonst Grossschwanzschafe genannten Schafe.

Waetzoldt fand, dass "die Wolle des Bergschafes (unser Landschaft) nicht ganz so gut wie die des Fettschwanzschafes (unser Grossschwanzschaf)" ist (UNT 5). Dieser interessante Tatbestand kann jetzt nicht mehr mit der Annahme zweier Schafarten erklärt werden.

Die zahlenmässige Verteilung ist in Tabelle 16 dargestellt: Fettschwanz 44%, sumerische 49%, schwarze 7%. Die Wollerträge aus dem Jahr AS 3 (SET 273) und AS 4 (SET 130) zeigen dagegen ein starkes Überwiegen der Wolle sumerischer Schafe (*síg-gi*):

Wolle in Pfund von	AS 3	AS 4
Grossschwanzschafen	2919	3295
sumerischen Schafen	6119	8645
schwarzen Schafen	248	348

In den Drehemtexten wurde der Ausdruck Landschaft nicht benutzt, aber die Wolle der Grossschwanzschafe nannte man Landwolle (*síg-kur-ra*; vgl. die von Waetzoldt in UNT Anm. 30 gesammelten Belege).

(4) Schwarze (sumerische) Schafe

Die schwarzen Schafe in Umma in YOS 4 237 korrelieren mit den Häusern der Inana, also speziell denjenigen der Inana von Zabalam, der Inana vom Ibgal und der Ninhilisu. Diese war nach der Bedeutung ihres Namens "Schönheit streuende Herrin" (*nin hi-li sù*) auch eine Inanagestalt. MVN 4 85 U nennt 1 gefallenes Mutterschaf und 2 Widder "schwarze Schafe der Inana". In dem Drehemtext PDT 1 429 ist unter der Abgabe des En der Inana 240 Pfund schwarze Wolle. Nach YOS 4 237 hatten die Inana Tempel ausschliesslich schwarze Schafe. Offenbar ging der Klerus von Inana schwarz gekleidet. Eine der von Inana aus Eridu verschleppten göttlichen Kräfte (*me*) war *túg-gi*, "schwarzer Stoff" (G. Farber-Flügge, *Der Mythos "Inana und Enki" unter besonderer Berücksichtigung der Liste der me* [1973] 106).

Die schwarzen Schafe der Inana in Umma müssen rein schwarz gewesen sein, denn ihre Hirten liefern nach MVN 13, 618 nur schwarze Wolle.

In der Falliste Orient 20 17 werden die Hirten schwarzer Schafe zu den Hirten sumerischer Schafe gerechnet. Daraus können wir schliessen, dass die schwarzen Schafe schwarze sumerische Schafe waren.

In Drehem werden schwarze Schafe ebenfalls gesondert aufgeführt. Vgl. die folgenden Angaben:

UDT 91	AUCT 1 28
1535 Schafe (<i>udu</i>)	22 Widder
81 schwarze Schafe	134 Mutterschafe
950 Simaški Schafe	108 schwarze Mutterschafe

7 Zu den Farbbezeichnungen

Die Farbe der nicht schwarzen sumerischen Schafe wird nur ausnahmsweise genannt. Ein wichtiger Beleg ist der Lagaštext UNT 1 = MVN 6 2. Er lautet:

27560 <i>u₈</i>	Mutterschafe
17084 <i>udu níta</i>	Widder
9939 <i>silá₄-bábbar</i>	weisse Lämmer
637 <i>máš-gal</i>	Böcke
347+ <i>ma-na</i>	Pfund
<i>síg-gi</i>	sumerische Wolle
704+ <i>ma-na</i>	Pfund
<i>síg udu šu-gíd ù ba-ús</i>	Fall- und Abgangsschafwolle

Die Nennung der weissen Farbe der Lämmer drückt hier vermutlich aus, dass die schwarzen Lämmer bereits ausgesondert waren und die gesamte Wolle weiss war.

Copenhagen 30 AS 7 IV u zählt Materialien für eine Struktur auf einem Boot (vgl. T. Jacobsen zum Text) auf. Sie sind:

55 <i>kuš-udu-gi₆</i>	55 schwarze Schafhäute
30 <i>kuš-udu-babbar</i>	30 weisse Schafhäute
1.5 <i>kuš-gu₄-háb</i>	1.5 gegerbte Rindschaut
1 <i>ma-na še-gín-nagar</i>	1 Pfund Schreinerklebe
4 <i>ma-na še-gín-ašgab</i>	4 Pfund Schusterklebe

Das sonstige Fehlen von als "weiss" bezeichneten einheimischen Schafen kann nur bedeuten, dass sie weiss waren. Das muss ein wirtschaftlich wichtiger Faktor gewesen sein, denn man konnte nur weisse Wolle färben und damit Stoffe produzieren, die leicht abzusetzen waren, vornehmlich in Gebieten, in denen es wenig weisse Wolle gab wie etwa in Simaški.

Die babylonische Ziege war gewöhnlich schwarz und wird deswegen in den Texten nicht als schwarz bezeichnet. Weisse, bunte und selten auch braune Ziegen kommen vor. Vgl. z.B. MVN 2 332 AS 7 IX, eine Ausgabe des für ungewöhnliche Arten zuständigen. Ūta-mišaram an die Küche für die "Helden" (*gàr-du*) des Königs:

1 <i>máš-gal-babbar</i>	weisser Bock
3 <i>uzud-babbar</i>	weisse Geissen

Vgl. weiter die Liste von Schlachtvieh, welches für die Arbeiter des Nakabtum bestimmt war, in PIOL 19 15 Š 46 IX:

35 <i>udu</i>	Widder
26 <i>udu-gi₆</i>	schwarze Widder
36 <i>u₈</i>	Mutterschafe
36 <i>máš-gal</i>	Böcke
35 <i>máš-gal-si₄</i>	braune Böcke
39 <i>uzud</i>	Geissen
26 <i>uzud-si₄</i>	braune Geissen

Vgl. schliesslich die nach CST 182 Š 47 VIII 9 von Šulgi-hāsis eingebrachten Ziegen:

3 máš-gal-gùn-a
 3 máš-gal-babbar
 24 máš-gal

bunte Böcke
 weisse Böcke
 Böcke

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Symbole

S Schaf	Z Ziege
W Widder	G Geiss
M Mutterschaf	B Bock
♂ Bocklamm	♂ Böckchen
♀ Mutterlamm	♀ Zicklein

1 Nähere Bezeichnungen von Kleinvieh in D(rehem) und U(mma)

		W	M	♂	♀	B	G	♂	♀	D	U
Milch	ga			+	+			+	+	+	+
gutes Herz	ša-du ₁₀							+	+		*
Brust	gaba			+	+			+	+	+	+
Bestand	gub	*		+	+			+	+	+	+
Erstrauf	AŠ.UR ₄	*		+	+					+	+
	diri	*		+	+			+		+	+
	gu-gu-tum-ma			+	*					+	*
Vollvlies	bar-gál	+	+	+	+					+	+
Leervlies	bar-su-ga	+	+	+	+					+	+
	bar-mú	*	*		*						*
	bar-ba-zi-ga	+		+							+
	bar-du ₈	*								*	
Pflanzstock	giš-dù	+		+		+		+		+	*
gross	gal							+		+	+
trächtig	sil ₄ /máš-dù-a		+				+			+	*
unfruchtbar	sil ₄ /máš-nú-a		+				+			+	
gut gemästet	niga-sig ₇	+	+			+			+	+	+
nächst gut gemästet	niga-sig ₇ -ús	+	+			+			+	+	*
nächst dritt gemästet	niga-3-kam-ús	+	+			+			+	+	
nächst viert gemästet	niga-4-kam-ús	+	+			+			+	+	
gemästet	niga	+	+	+	+	+	+	+	+	+	+
	niga-gu ₄ -e-ús-sa	+	+	*		+	+			+	+
Gras	ú	+	+			+	+			+	+
Botschaft	kin-gi ₄ -a	+		+						+	+
männlich	nfta	+		+				+		+	+
	UD.DU.LI			+							+
	MAŠ			*	*			*		*	

2 Artbezeichnungen von Kleinvieh in D(rehem), L(agaš), U(mma) und Ur

Übersetzung	Transliteration	D	L	U	Ur	w	s	br	b
	unbezeichnet	+	+	+	+	*	+		
sumerisch	eme-gi	+	+	+	+		+		
Grossschwanz	gukkal	+	+	*	+	+	*		
Land	kur			+					
	kir-ru-um		*	*	+				
Alum	a-lum	+		*		+	+		
Simaški	Simaški	+				*	+	+	+
Lulum	lú-GIŠGAL-um	+	*				+		
Šarumium	ša-ru-mi-um	+							
Langschwanz	kun-gíd	+							
Rohr	gi	+							
	en-zi	+							
Kirtappum	gal-tab-bu-um	+							+
Mufflon	hur-sag	+							
Mufflonsamen	a-hur-sag	+							
	Ziegen								
	unbezeichnet	+	+	+	+	+	+		
Simaški	Simaški	+					+	+	+
Viersprossen	umbin-4	+							
Makkan	Má-gan	+							
Steinbock	dara ₄	+							
Steinbocksamen	a-dara ₄	+							

* selten; w babbar weiss; s gi₆ schwarz; br si₄ braun; b gùn bunt

3 Wurfurkunden aus Drehem

Text		S	Z	Ort
MVN 13 94	AS 2 I	3	2	
BIN 3 46	AS 2 I	7	6	
TCNSD 175	AS 2 I		11	Nakabtum
TCNSD 96	AS 3 I	2	2	Nakabtum
CST 459	I		2	auf dem Weg
AUCT 1 734	AS 2 II	8		Nakabtum
SACT 1 68	AS 1 III	9	11	
TRU 97	AS 2 III	3	2	
TPTS 20	AS 2 III	2	1	
PDT 2 1185	AS 2 III	1	1	
MVN 13 95	AS 3 III	1		Nakabtum
TCL 2 5641	AS 3 III	5	1	Nakabtum
PDT 1 224	AS 1 IV	5		
PIOL 19 200	AS 1 IV	6	3	
TCNSD 393	AS 1 IV	8	5	
TCNSD 79	AS 1 IV	11		Schafhaus in Nippur
Nikolski 503	AS 2 IV	3		Nakabtum
SET 14	AS 3 IV	8		Nakabtum
AnOr 7 29	AS 3 IV	4		Nakabtum
GDD 13	AS 2 V	26		Tummal
CST 272	AS 3 V	2	2	Nakabtum
TCNSD 170	AS 4 V	8	10	Nakabtum
Lager 44	Š 46 VI	34		Ur + Nippur, Ort Naša
BIN 3 371	AS 1 VI	2	4	
CST 255	AS 2 VI	5		Nakabtum
Mes. 8-9 151 7	AS 1 VII	4		
MVN 13 91	AS 1 VII	3	3	
AUCT 1 597	AS 2 VII	2		
CST 278	AS 3 VII	12		Nakabtum
Trouvaille 40	Š 44 VIII	105	37	Ort Naša
CST 234	AS 1 VIII	3		Schafhaus in Nippur
TLB 3 99	AS 1 VIII	5		Nakabtum
TCNSD 91	AS 2 VIII	3	3	
Trouvaille 22	AS 3 VIII	41		in Ur
UCP 9/2 19	AS 4 VIII	2		Schafhaus
SACT 1 91	AS 5 VIII		1	auf dem Weg
MVN 2 111	[] VIII	[]	8+	[]
TCNSD 81	AS 1 IX	14		Nakabtum
TCNSD 82	AS 1 IX	15	7	
TCNSD 80	AS 1 IX	17		é-udu-sag in Tummal
TPTS 30	AS 1 IX	21	21	
TCNSD 83	AS 1 IX	13	23	
Cooper 2	AS 1 IX	8	4	Schafhürde in Nippur
JEOL 26 8	AS 1 IX	21	6	Nakabtum
BIN 3 35	AS 2 IX	3	1	
TCNSD 401	AS 3 IX	11		Nakabtum
CST 291	AS 4 IX	3		Nakabtum
TPTS 22	AS 4 IX	5		Nakabtum
PDT 2 1102	AS 4 IX	29	6	Nakabtum
TCNSD 171	AS 4 IX	25		Nakabtum
AnOr 7 20	AS 1 X	13	10	
MVN 13 92	AS 1 X	6	13	
MVN 13 93	AS 1 X	11	3	Nakabtum
JCS 35 190 2	AS 1 X	5	7	Nakabtum
TCNSD 93	AS 2 X	3	1	
TCNSD 94	AS 2 X	4	7	
Cooper 3	AS 2 X	5		Nakabtum
Atiqot 4 58	AS 2 X	2	6	

CST 283	AS 3 X	19		Nakabtum
TRU 93	AS 3 X	11		Nakabtum
DC 91	AS 3 X	6		Nakabtum
PDT 1 156	AS 4 X	19		Nakabtum
TCNSD 172	AS 4 X	31	17	Nakabtum
TCNSD 173	AS 4 X	14	5	Nakabtum
Emory 45	AS 4 X	23		Nakabtum
MVN 2 101	AS [] X	23		Nakabtum
CST 151	Š 46 XI	19	16	Nippur und Ur
TCNSD 88	AS 1 XI 5	2	2	
TCNSD 84	AS 1 XI 8	28	7	
CST 240	AS 1 XI 13	21	4	Nakabtum
TCNSD 85	AS 1 XI 14	20	3	Nakabtum
TCNSD 90	AS 1 XI 18	21	4	Nakabtum
CST 241	AS 1 XI 21	7	2	Nakabtum
MVN 15 345	AS 1 XI 22	7	20	
TCNSD 87	AS 1 XI 23	21	8	
TRU 100	AS 2 XI	3	1	
UCP 9/2 11	AS 2 XI	3		
JMEOS 12 3504	AS 2 XI	27	12	
CST 284	AS 3 XI	17	6	Nakabtum
AnOr 7 113	AS 4 XI	8	6	Nakabtum
MVN 13 96	AS 4 XI		3	Nakabtum
JCS 23 18	AS 1 XII	6	3	
Cooper 4	AS 1 XII	1	4	
SACT 1 66	AS 1 XII	7	3	
TRU 91	AS 1 XII	6		Nakabtum
TRU 94	AS 1 XII		3	
PDT 2 1124	AS 1 XII	30	3	
Atiqot 4 59	AS 2 XII	4	1	Nakabtum
TLB 3 100	AS 3 XII	5		Nakabtum
SACT 1 67	AS 4 XII	5	10	Nakabtum
MVN 2 310	AS 4 XII	26	8	Nakabtum
MVN 8 197	AS 4 XII	17	16	Schafhaus
CST 338	AS 5 XII		4	auf dem Weg
CTNMC 15	AS 5 XII		1	

S Schafe; Z Ziegen; Schafhaus é-udu; Schafhürde gá-udu.

4 MVN 13 874 Ausgabe des Knappen Ahūni

	Š	K	M	P	U	Ka	A	L	Šu	Fall		Summe
u ₈	127	1070	167	126	74	156	64				u ₈	1856
kir ₁₁ -gub	72											
udu	125	433	64	92	33	180	26			30	udu	1074
sil ₄ -gub	120											
sil ₄		326	17	18		13					sil ₄	628
sil ₄ -ga								253				
ud ₅	153	123	7	1		9	67		60		ud ₅	420
mās-nfta	147	121	9	2	3	4	23			7	mās-nfta	429
mās-gub	120	97*										
mās-ga				1		3		78			mās-ga	179
Summen	864	2170	264	240	110	365	180	331		37		4623

Quittiert von dem Statthalter von Š(uruppak), K(azallu), M([arad]), P(us), U(R₂xU₂.ki), Ka(digira), A(bilānum, dem Amoriter), L(ugal-ituda), Šu(²-Ba-ba-ti).

*: 97 mās-gub ist Fehler für mās-ga, wie aus Summenangabe hervorgeht.

Die Zahlen enthalten geringfügige alte Rechen- oder moderne Kopiefehler.

5 Ausgabe von Pflanzstockkleinvieh durch die Zentrale

		Empfänger	Art
Nikolski 467	Š 45 VIII	Ahuja	4 Simaški
TRU 79	Š 46 III	Ahuja	1 Grossschwanz 1 weisser Grossschwanz
JCS 24 16	Š 46 V	Na-LUL	1 Grossschwanz
RA 79 9	Š 46 XII	Ahuja	9 Grossschwänze 3 Lulum
TAD 21	AS 1 VII	Ahuja	2 Grossschwänze
UDT 104	AS 1 VIII	Endigirgu	1 Grossschwanz
BIN 3 32	AS 1 X	Na-LUL	2 gemästete Alum
JCS 23 19	AS 2 II 1	Ludigira	1 Grossschwanz
TRU 96	AS 2 II 11	Šulgiaagu	3 Grossschwänze
MVN 8 33	AS 2 II 11	Ludigira	2 Grossschwänze
MVN 10 170	AS 2 III 10	Ludigira	1 weisser Grossschwanz
AUCT 1 620	AS 2 III 19	Šulgiaagu	1 Grossschwanz
Nesbit XVI	AS 2 VI	Na-LUL	2 Alum 2 Grossschwänze
GDD 66	AS 2 VI 25	Na-LUL	2 Grossschwänze 2 weisse Grossschwänze
AUCT 1 854	AS 2 VII	Šulgiaagu	1 gem. weisser Grossschwänze
Akk 25 S.9	AS 4 I	Lunanna	5 Grossschwänze
AUCT 2 267	AS 4 I	-	1 Alum
TENUS 342	AS 4 III	Šulgiaagu	1 Grossschwanz
BIN 3 89	AS 4 IV	Ahuwer	1 Alum 1 Grossschwanz
UDT 106	AS 4 VI 17	Ilallum	1 Grossschwanz
AUCT 2 243	AS 4 VI 17	Na-LUL	4 Grossschwänze 2 Grossschwanzlämmer 1 Alumlamm
PDT 1 352	AS 4 VI 22	Ahuwer	12 Grossschwänze 17 Grossschwanzlämmer
TAD 13	AS 4 VI 30	Ludigira	6 Makkanböcke
BIN 3 100	AS 4 VIII	Šulgiaagu	2 Grossschwänze
MVN 2 104	AS 5 II	Ahuwer	2 Grossschwänze 1 weisser Grossschwanz
PDT 1 84	AS 5 IV 6	Na-LUL	7 Simašiböcke
ŠA XIII	AS 5 IV 8	Na-LUL	11 unqualifiziert
MVN 13 455	AS 5 IV 8	Šulgiaagu	14 unqualifiziert
PDT 1 46	AS 5 IV 28	Na-LUL	1 Grossschwanz
CST 321	AS 5 VI 24	Šulgiaagu	3 Grossschwänze
MVN 9 211	AS 5 VI 24	Ahuwer	3 Grossschwänze
MVN 13 452	AS 5 VI 27	Na-LUL	3 Alum 3 Grossschwänze
BIN 3 104	AS 5 VII	Ahuwer	1 weisser Grossschwanz
TPTS 35	AS 5 VII 20	Na-LUL	2 Alum
Nikolski 451	AS 5 VIII	Endigirgu	1 Grossschwanz
TRU 155	AS 5 X	Na-LUL	4 Grossschwänze
AUCT 2 187	AS 5 X 19	Šulgiaagu	4 Grossschwanzlämmer
Boson 67	AS 5 XII	Šulgiaagu	1 Alumlamm 2 Grossschwänze
MVN 8 56	AS 6 I	Ūta-mišaram	1 Grossschwanz
AUCT 1 523	AS 6 III	Šumama	2 Grossschwänze 1 weisser Grossschwanz
CST 347	AS 6 V	Ūta-mišaram	1 Grossschwanz
TCL 2 5615	AS 6 VI 13	Ūta-mišaram	1 Grossschwanz
BIN 3 282	AS 6 VI 20	Ūta-mišaram	1 Grossschwanz
MVN 8 62	AS 6 VI 23	Ūta-mišaram	1 Grossschwanz
JCS 23 27	AS 6 VII	Ahuwer	1 Simaški

MVN 8 70	AS 6 X	Na-LUL	2 Grossschwänze
GDD 99	AS 6 XII 7	Na-LUL	1 Alum
TCNSD 161	AS 6 XII 9	Ūta-mišaram	1 gemästeter Alum
AUCT 1 133	AS 6 XII 27	Na-LUL	3 Grossschwänze
AUCT 1 416	AS 8 V	Ilallum	1 Grossschwanz
MVN 8 86	AS 8 VI 10	Zu-ba-ga	2 Grossschwänze
PDT 1 568	AS 8 VI 22	Na-LUL	1 Alum
PDT 1 353	AS 8 VII 7	Na-LUL	1 Alum
BIN 3 177	AS 8 VII 14	Na-LUL	1 weisser Grossschwanz
AUCT 1 301	AS 8 IX	Ūta-mišaram	1 Šarumium
PDT 2 818	AS 9 IV 29	Tahišatal	6 Steinbocksamenböcke
MVN 10 171	AS 9 V 2	Zu-ba-ga	2 Alum
GDD 119	AS 9 V 2	Ahuwer	1 Alum
AnOr 7 41	ŠS 6 V	Dudu	1 Grasgrossschwanz
AUCT 2 321	[]	Na-LUL	4 Grossschwänze
			1 weisser Grossschwanz
			4 Alum

Alle Tiere sind mit **gis-dù** näher bezeichnet. Wenn nicht ausdrücklich Böcke, sind es Widder. "Lamm" steht kurz für Bocklamm.

6 Zusammenfassung von Tabelle 5

25	Unqualifizierte
84	Grossschwanzwidder
1	Grasgrossschwanzwidder
23	Grossschwanzbocklämmer
10	Weisse Grossschwanzwidder
1	Gemästete weisse Grossschwanzwidder
18	Alumwidder
3	gemästete Alumwidder
2	Alumbocklamm
5	Simaškiwidder
3	Lulumwidder
1	Šarumiumwidder
7	Simašiböcke
6	Makkanböcke
6	Steinbocksamenböcke

7 Pflanzstockkleinvieh in den Šusuma Texten

Text	1	2	3	5	7	8
Schafe						
Unqualifiziert	9	3	11	12	3*	5*
Grossschwanz	2					
Simaški	28					
Dunkle Simaški	2					
Langschwanz	5					
Kirtappum	1					
Mufflonsamen	12					
Šarumium	2					
Ziegen						
Nicht qualifiziert	2		6	9	3*	4*
Simaški	9					
Steinbocksamen	13	1	1			

*: **gis-dù-ú** "Graspflanzstock"

8 Botschaftschafe in den Ausgaben des **bal**

			W+	W	Bt	M	♂	♀	Kä
1	IS 1 VII 13	TCL 2 5482	10	12	10	1*	42	7	20
2	IS 2 VI 14	RA 75 S.83	10	2	5		18	7	10
3	IS 2 IX 27-29	MVN 10 144	32	27	14	17	41	47	22+
4	IS 2 X 3	MVN 13 124	10	4	6		14		12
5	IS 2 X 6	TCL 2 5514	10	8	7		22	2	7
6	IS 2 X 9	SET 57	11	6	5		18		15
7	IS 2 X 15	PDT 1 342	10	2	5		17		10
8	IS 2 X 24	SET 58	10	2	8		8		10
9	IS 2 X 25	MVN 13 128	10	8	11		12		7

W+ gemästeter Widder; Bt im ersten Text Botschaftwidder, sonst Botschaftbocklamm;
* unfruchtbares Mutterschaf; Kä(se in Liter)

9 JCS 14 15 "für das **bal** des Statthalters von Sippar"

		MD	Der	Ms	Als	Isin	Summe
verschiedene Schafe šugid	udu- hi-a šu-gfd	240	180	120	40	40	620
Botschaftbocklammwidder	udu-sila ₄ - kin-gi₄-a		120	120			240
trächtige Mutterschafe	u ₈ -sila ₄ -dù-a		"120"	"120"	"20"	"20"	"280"
verschiedene Ziegen šugid	ud ₅ -mās- hi-a šu-gfd	240	420				660
Pflanzstockböcke	mās-gis-dù	180	180	120			480
trächtige Geissen	ud ₅ -mās-dù-a	"120"					"120"
Zicklein	ašgar		60				60
Summe		900	1200	600	80	80	2860

MD Maškan-DU.DU; Ms Maškan-Šāpir; Als Ālsarrāki

10 Beute (nam-ra-ak) aus Šašrum und Šuruthum AS 4 VIII, von der Zentrale an verschiedene Personen ausgegeben

Tier	a	b	c	d	e	f	g	Summe	%
gu4-niga		28						28	7.29
gu4	59	63	6		23	2		153	39.84
gu4-gùn-a			31					31	8.07
gu4-mu-2			1					1	0.26
áb	2	79	20		20	17		138	35.94
áb-gùn-a		21	11					32	8.33
áb-mu-2			1					1	0.26
								384	7.85
udu		140	1					141	8.30
udu-S		83	73	203				359	21.13
udu-gi6-S	24	"5"		26				55	3.24
udu-gùn-a-S			24				5	29	1.71
u8-S	28	179						205	12.07
u8-gi6-S	20	74	251	120	80		120	665	39.14
u8-si4-S					108			108	6.36
u8-gùn-a-S			52				85	137	8.06
								1699	34.72
máš-gal	258							258	9.18
máš-gal-S	192	12		38				242	8.61
máš-gal-si4-S			39	31		80	110	260	9.25
máš-gal-gi6-S				8				8	0.28
uzud-S	189	413			28			630	22.42
uzud-si4-S			785			100		885	31.49
uzud-gi6-S			220	142			30	392	13.95
uzud-gùn-a-S			135					135	4.81
(Junge S+Z	1	106	4					111)	
								2810	57.43
Summe	770	1097	1650	530	297	199	350	4893	100

a GDD 77	AS 4 VIII 17	Intaea
b AnOr 1 13	AS 4 VIII 17	Šulgiaagu
c TAD 56	AS 4 VIII 29	Šulgiaagu
d Trouvaille 52	AS 4 VIII 29	Na-LUL
e AnOr 1 12	AS 4 VIII	Statthalter von Ġirsu
f TCL 2 5490	AS 4 VIII	Statthalter von Kis
g UDT 148	AS 4 VIII	[]
S Simaški		

11 Abrechnung des Hirten Šuniannam

	G	Q	Š
libir-àm		371	104
Na-kab-tum-ta		533	196
nam-ra-ak Simaški		293	7
mu-DU didli			1
nam-ra-ak kur Mar-tu		110	
Ur-mes-ta		16	3
La-ba-an-sum-e-ta	5		1
			1635
Ur-me-me i-dab5		92	19
šu-gíd Ur-kù-nun-na i-dab5		252	52
ba-ús		365	105
			885
gub-ba-àm		631	116

12 Kleinvieharten in den Texten des Ūta-mišaram

Schafe	W	W+	gd	M	Š	Š+	gd	Q	Šg	Qg
Grossschwanz			8	13						
weisse Simaški				9	1			2		
schwarze Simaški				7	2			4	2	
Langschwanz			4	53	2	2		[9]	2	
Mufflonsamen			2	26	2	3		9		
Šarumium	1	15	3	19	1			4		
Alum	3			1	5	5		11	1	2
Lulum	7		1	16		2		5	1	
Rohr		26	5	18	1+	4	8	11	2	
EN-zi		4								
Ziegen	B	B+	gd	G	Š	Š+	gd	Q		
nicht qualifiziert				4				2		
weiss		144	7	72	5	10	25			
Simaški	15			30						
bunte (Simaški)	42			34						
schwarze Simaški				1						
Viersprossen			4	12	2			3		
Steinbocksamen								1		

+ nach Symbolen bezeichnet niga gemästet; gd giš-dù; Q g und Š g Milchlämmer

13 Kleinvieharten in Šusuma Text 1

		1	2	3	4	5	6	7	šu-gíd
W	unbezeichnet	126	115	132	39	1222	367	11	
	Grossschwanz	7	4	14		19		3	
	Alum	26	1	19		7			
	Simaški	21	13	13		40		13	
	Lulum	26	3						
	bunte Kirtappum		1						
	Mufflonsamen		2	2		2			
M	fünfbeinig							1	
	unbezeichnet		1			4			77
	Grossschwanz								4
	Simaški								2
♂	unbezeichnet					123		604	
	Langschwanz							2	
	Grossschwanz							5	
	Kirtappum					36			
	bunte Kirtappum							6	
	Simaški					136		175	
	schwarze Simaški					20		24	
	Šarumium							5	
	Mufflonsamen							24	
♀	unbezeichnet							44	
	Langschwanz							3	
	bunte Kirtappum							3	
	Grossschwanz							5	
	Simaški					25		107	
	schwarze Simaški							2	
	Šarumium							13	
	Mufflonsamen					12		35	
B	unbezeichnet	1	1	1		38	127	28	
	gurg-gurg					2			
	Steinbocksamen		1	1		2	68		
	Simaški	50	16	63		45	55	47	
G	unbezeichnet								23
	vierbeinig							3	
♂	unbezeichnet							17	
	Simaški					4		8	
	Steinbocksamen							38	
	Vierbeinig							3	
♀	unbezeichnet	1	1			5		11	
	Simaški	41	41			59		7	
	Steinbocksamen					33		60	
	vierbeinig							7	

14 Kleinvieh in den Šusuma Texten

	Text	1	2	3	4	5	6	7	8	9	Summe	%
W	1	204	139	180	39	1290	395	89*			2336	
	3	24	26	45	93	443	220	1026			1877	
	7	3	7	123	87	161	193	376			950	
	8	114	139	268	220	186	114	733			1774	
M	1	-	1			4		813*	83*		901	51.42
	3	3	3	2	3	4		231			246	
	7		3					105			108	
	8	2	2	2	2	8		363			379	
♂	1					325			335*		660	12.11
	3					46			34	32	112	
	7					19			37		56	
	8					12			81	4	97	
♀	1					37			212*		925	6.86
	3					26			11	10	47	
	7					30			21		51	
	8					18			52		70	
B	1	51	18	65		87	250	101*			417	3.09
	3	15	11	19	19	23	19	793			572	
	7		3	6	8	17	62	4			899	
	8	16	19	36	33	53	18	386			100	
G	1										561	
	3							248*	23*		2132	15.8
	7							181			271	
	8							61			181	
♂	1										61	
	7					4			66*		198	5.27
	8								38		70	
									1	2	38	
♀	1	42	42			97					111	0.82
	3	5	5	4	8	38			85*		266	
	7			3	4	59			52		112	
	8	5	4	3	12	48			21		87	
									85	2	159	
											624	4.63
		484	422	756	528	3035	1271	5708	1237	50	13491	
	%	3.59	3.13	5.60	3.91	22.5	9.42	42.31	9.17	0.37		100

Text 1 PDT 2 1052 AS 8 XII
 3 BIN 3 240 ŠS 4 IX
 7 SET 76 = MVN 9 196 ŠS 6 XIII
 8 CT 32 38 ŠS 9 XIII

1. **niga-sig7** gut gemästet; 2. **niga-sig7-ús** nächst gut gemästet; 3. **niga-3-kam-ús** nächst dritt gemästet; 4. **niga-4-kam-ús** nächst viert gemästet; 5. **niga** gemästet; 6. **niga-gu4-e-ús-sa**; 7. **ú** Gras oder * unbezeichnet; 8. **gaba** Brust oder * unbezeichnet; 9. **ga** Milch

15 Umma Kleinviehzählung YOS 4 237 SS 7 II

Hirt	M	Q	W	♂	Art	Haus	Aufseher
Lugal-é-mah-e	[147			udu-gukkal	Sara	KAS ₄
FM 48	78	11			udu-kur-ra		
Lú-kal-la*	141	34	62	33	udu-eme-gi		
Ur-d.Sará*	78	19	50	18			
Šu-Eš ₄ -dar*	90	23	68	22			
Ur-ša ₆ -ga*	39	10	23	9			
Níḡ-du ₇ -pa-è	68	13	66	13			
Ab-ba-gi-na	31	5	24	5			
d.Sará-kam*	180	42	91	41	uzud-nam-en-na		
Lugal-é-mah-e*	6	6	1	5			
Ša-kù-sig ₁₇	14	4	22	3			
Lù-d.Sará*	80	18	41	18			
Lú-lb-gal	100	-	20	-	uzud-ga-za-pi		
Lú-digir-ra	40	-	10	-			
Ša-kù-sig ₁₇	79	-	16	-			
Ur-TAR.LUH	15	-	5	-			
Ša-kù-sig ₁₇ *	198	41	161	41	udu-gukkal	Ninura	Uree
Lú-lb-gal	270	53	190	52			
Ur-d.Nin-SU	251	40	181	41			
FM 48	235	37	164	36	udu-kur-ra		
Hé-ša ₆ -ge	101	25	86	24	udu-eme-gi		
Ur-[giš.gigir]*	44	11	26	10			
Lú-kal-[la]	61+	[]	62+	22+			
Ur-d.Šul[-pa-è]*	20	[]	20	[]			
Lugal-ni-zu*	41	10	44	10			
Ur-d.Dumu-zi*	20	5	20	4			
d.Sará-kam*	93	25	85	25			
Ab-ba-ša ₆ -ga*	55	12	22	13			
Igi-tur-tur*	24	5	15	5			
Lú-d.Sará	30	-	10	-	uzud-ga-za-pi	Šulgi	
Šeš-kal-la*	30	6	13	6	udu-eme-gi		
Im-a-ni	15	-	14	-	uzud-ga-za-pi		
A-bi-a*	89	31	55	30	udu-gi ₆	Inana Z.	
Ma-ma*	52	14	50	14	uzud-nam-en-na		
Giri-ni-l-ša ₆	80	14	80	14			
Giri-ni-l-ša ₆	54	-	21	-	uzud-ga-za-pi		
Ur-d.Utu	13	4	8	4	udu-eme-gi	Gula	
Lú-d.Suen	35	[]	16	7	uzud-nam-en-na		
Im-a-ni*	33	7	20	8	udu-gi ₆	Inana I.	
	20	-	10	-	uzud-más-hi-a		
A-a-kal-la	20	-	8	-	uzud-ga-za-pi	Ee	
	9	1	5	1	udu-gi ₆	Ninhilisu	
	40	-	5	-	uzud-ga-za-pi		
Šeš-kal-la*	122	28	94	28	udu-gukkal		Urmungal
FM 48	115	23	88	22	udu-kur-ra		

16 Summen in YOS 4 237

			%
u ₈	Mutterschafe	917	47.29
sil ₄ -gub	Bestandlämmer	174	8.97
udu-níta	Widder	675	34.81
sil ₄ -gub	Bestandlämmer	173	8.92
udu-gukkal	Grossschwanzschafe	1939	44.29
	Mutterschafe	969	45.07
	Bestandlämmer	237	11.02
	Widder	714	33.21
	Bestandlämmer	230	10.7
udu-eme-gi	sumerische Schafe	2150	49.11
	Mutterschafe	131	45.33
	Bestandlämmer	39	13.49
	Widder	[80]	27.68
	Bestandlämmer	[39]	13.49
udu-gi ₆	schwarze Schafe	289	6.6
udu-hi-a	verschiedene Schafe	4378	74.63
uzud	Ziegen	447	
más-gub	Bestandböckchen	106	
más-níta	Böcke	301	
más-gub	Bestandböckchen	102	
uzud-nam-en-na	Herrenschafsziegen	956	64.25
uzud	Ziegen	413	
más-níta	Böcke	119	
uzud-ga-za-PI		532	35.75
uzud-más-hi-a	verschiedene Ziegen	1488	25.37
udu-más-hi-a	verschiedenes Kleinvieh	5866	100

17 MVN 13 618 Abrechnungen der ersten 7 Hirten der Herden der Ninura über sumerische Schafe

Rubrik		He	Ug	LL	Uk	La	Ka	Sa
gubam	u ₈	161	147	180	40	73	67	120
	udu-níta	148	80	97	32	38*	41	110
	kir ₁₁	28	22	35	14	3	10	31
	sil ₄ -níta	28	21	35	13	[2]	9	31
mu-DU	síḡ-bi	674	497	624	170	227	235	522
	u ₈ -bar-gál	35	8	14	14	32	15	11
	udu-níta-bar-gál	-	7	8	13	-	7	6
	kir ₁₁ -bar-gál	16	3	12	1	18	7	8
é-udu-sè	sil ₄ -níta-bar-gál	15	2	11	1	17	6	8
	u ₈ -bar-gál	4	-	-	5	9	-	-
	udu-níta-bar-gál	22	31	16	30	-	-	34
	sil ₄ -bar-gál	6	-	-	4	4	-	-
nisag d.En-líl-lá	u ₈ -bar-gál	2	-	1	-	2	-	-
	sil ₄ -bar-gál	2	-	1	-	2	2	-
	u ₈ -bar-gál	124	135	190	95	235	[]	60
	udu-níta-bar-gál	210	96	196	124	270	[]	35
lá-ì-àm	kir ₁₁ -bar-gál	15	31	30	5	39	20	-
	sil ₄ -níta-bar-gál	14	31	30	5	38	20	-
	u ₈	20	-	8	5	10	9	-
	udu-níta	20	46	10	9	16	12	-
šunigin	kir ₁₁	10	5	2	10	10	2	-
	sil ₄ -níta	10	5	2	10	10	-	-
	síḡ-bi	100	102	40	48	72	44	-
	gubam	365	270	347	99	116	[127]	292!
	zigam	102	51	63	68	84	[37]	[67]
	rīngam	363	313	386	229	582	[]	[95]
	lá-ì-àm	60	56	22	34	46	23	-

He Hé-ša₆-ge; Ug Ur-giš.gigir; LL Lugal-LAL₂.TUG₂; Uk Ur-kù-nun-na; La La-la-mu; Ka ka₅.a-mu; Sa d.Sará-kam

18 MVN 13 618 AS 7 U Abschliessende Summenangaben der Abrechnung der Hirten der sumerischen Schafe der Tempel von Sara, Ninura, Sulgi, Inana und Gula

Bestand			%
Bestand	Mutterschafe	2375	41.87
	Vollvliemutterschafe	36	0.63
	Widder (udu-níta)	1968	34.7
	Vollvlieswidder	60	1.06
	Mutterlämmer	457	8.06
	Vollvliesertraufmutterlämmer	4	0.07
	Bocklämmer (sil ₄ -níta)	447	7.88
	Vollvliesertraufbocklämmer	3	0.05
		5672*	51.34
Einkommen	die Wolle (síḡ-bi)	9416.5	
Abgang	Vollvliemutterschafe	360	33.52
	Vollvlieswidder	413	38.45
	Vollvliesmutterlämmer	142	13.22
	Vollvliesbocklämmer	159	14.8
	más für Vollvliesbocklämmer "3"***		
		1074	9.72
Fall	Vollvliemutterschafe	1680	44.43
	Vollvlieswidder	1564	41.36
	Vollvliesmutterlämmer	271	7.17
	Vollvliesbocklämmer	266	7.04
		3781	34.23
Abzug (lá-ì)	[Mutterschafe]	131	25.19
	Widder	257	49.42
	Mutterlämmer	66	12.69
	Bocklämmer	66	12.69
		520	4.71
Aufstockung (dah-ḡu-àm)	die Wolle	908	
Aufstockung (dah-ḡu-àm)	Leervliesmutterchafe	127	2.24
	Leervlieswidder	144	2.54
	Leervliesmutterlämmer	24	0.42
	Leervliesbocklämmer	36	0.63
		11074	100

*Die Summe (LAGAB.LAGAB-ba) des Bestandes schliesst die Aufstockung ein.
**3 oder 180. In die Summierung und Prozente nicht aufgenommen.

19 SET 130 AS 4 U Die Tierbezeichnungen der Einnahme- und Ausgabeposten

	M	M+	M-	W	W+	W-	Q	Q-	Q	Q+	Q-	g	Z	G	B	m	Q
E 1				941						12						1193	
2					353					42				1			
3					86					13							
4													59				
6																15	
7	31			30*	20*		6			30+6*							
8	19			10*			1			1*							
9		24	50		28*	91*				28		22	53			30	
10																32	
11		52			131*					17				1	10*		
12		82			41*											27	
13					2					1							
					1850	141				312			1449				
A 1				2	14	69										[96]	
2				27												5	
3					10												
4					223					22						33	
5					[625]					11						54	
8					2	14										1	
9			[275]			195*		55							3*		7
10					224					72						148	
					1126	672				105						347	

E(innahme) und A(usbabeposten)

E	1 Rest vom Vorjahr	A	1 Versorgung der Götter
	2 von den Hirten der sumerischen Schafe		2 Feldopfer
	3 von den Hirten der Fettschwanzschafe		3 Übertragung einer Tilgung auf Lukal
	4 von den Ziegenhirten		4 Übertragung auf []
	5 von den Rinderhirten		5 Übertragung auf Lú-d.Nám-nun-ka
	6 von den Hirten des DU.DU Kleinviehs		6 Übertragung auf den Statthalter
	7 Tilgung für AS 2		7 bevorstehende Übertragung auf Ur-Sulpa
	8 Tilgung für AS 3		8 []
	9 Einkommen des Šara von Apisál		9 Übergabe an Herrschaftshirten
	10 Zweijahreinkommen der Inana von Zabalam		10 vom Statthalter quittierter Fall
	11 Schafe des Wezirs Lugalkuzu		
	12 Einkommen aus Gersteausleihen		
	13 Einkommen des Šara von Tell Lugal-DU		

* plus níta; + bar-gál; - bar-su-ga; Böckchen mās-níta-ša-du₁₀; g = Milchbocklamm.
Die 22 Milchbocklamm wurden in den Summenangaben nicht berücksichtigt.
Die Summanden der Summ 1126 ergeben 1127. Die Zahlen nach Kollation von K. Hillard.

20 Fallurkunden aus Umma

MVN 14 111	Š 36 X	Ur-ru	1 udu-bg
UDT 70A	Š 36 XI	Ur-ru	3 udu-bg
Atiqot 4 19	Š 36 XIII	Ur-ru	1 udu-níta-AŠ.UR ₄
MVN 14 82	Š 37 I	Ur-ru	1 ug-kur
MVN 2 315	Š 37 VI	Ur-ru	1 udu-kur
MVN 14 125	Š 37 VIII	Ur-ru	1 ug-kur-ra
Peat JCS 48	Š 37 IX	Ur-ru	1 sila ₄ ù-tu-da
Molina 2	Š 37 X	Ur-d.Istaran	1 udu
MVN 14 15	Š 38 XII	Ur-d.Istaran	1 ug
MVN 14 5	Š 39 II	Ur-ru	1 udu
AAS 55	Š 40 XII	Ur-ru	1 udu-níta-bg
Peat JCS 47	Š 40 XIII	Ur-ru	1 udu-níta-bs
MVN 14 18	Š 41 V	Ur- d.Istaran	2 udu-kur
MVN 14 10	Š 42 I	Ur-d.Istaran	1 ug
TPTS 158	Š 43		23 udu-bg
			87 udu-bs
			16 sila ₄ -bg
GDD 228	Š 43	Ba-ša ₆	5 ud ₅ -gan-na
Molina 3	Š 44	Ur-d.Istaran	7 ug-bg
			2 udu-níta-bs
SACT 1 107	Š 45 X	Ur-d.Ma-mi	6 udu
			9 mās
AAS 56	Š 45 XI	Lú-Zabalam.ki	1 ug
TPTS 173	Š 45 XII	Ur-ru	3 ug
Peat JCS 46	Š 46 III	Ur-ru	1 ug
			1 kir ₁₁
			2 udu-níta
Peat JCS 45	Š 45 III	Lú-ib-gal	1 udu-níta
Nikolski 387	Š 46 VIII	Am ₃ -ma	2 ug
PIOL 19 89	Š 46 X	Lú-d.Suen	1 mās
Talon I 3	Š 46 XIII	Ur-ru	1 ug
PIOL 19 91	Š 46 XIII	Lú-Zabalam.ki	5 ug
			2 udu-níta
MVN 14 123	Š 47 II	Ur-ru	1 udu níta
MVN 2 311	Š 47 VII	Ur-ru	1 udu-níta
SAKF 69	Š 47 XIII	Ur-d.Istaran	1 ug
AnOr 1 71	Š 47	Lugal-á-zi-da	6 ug
			3 udu-níta
MVN 14 62	Š 48 II	Ur-ru	1 udu
MVN 10 201	Š 48 VII	Ur-ru	1 udu-níta-kur-ra
Atiqot 4 27	Š 48 VIII	Ur-ru	1 ug
TLB 2 139	Š 48 X	Ur-ru	1 ug
SAKF 4	Š 48 X	Ur-ru	1 kir ₁₁ -AŠ.UR ₄
MVN 2 312	Š 48 XI	Ur-ru	3 ug
MVN 14 46	AS 1 XII	Lugal-á-zi-da	2 ug-bs
			2 udu-níta-bs
CCBT 2 6	AS 2 IV	Lugal-á-zi-da	1 ug
SET 130	AS 4	Níĝ-du ₇ -pa-è	64 udu-bg
			8 sila ₄ -bg
			72 mās
		Šà-kù-sig ₁₇	24 udu-bg
		Ab-ba-sig ₇	21 udu-bg
			1 mās
		Lugal-úr-ra-ni	32 udu-bg
			4 mās
		Lugal-kù-zu sukkal	2 udu-bg
		Ab-ba-gi-na	9 mās-GAN-na
		NE-da	7 udu-bg
		Ir ₁₁ -ĥu-la	13 mās
		Ur-giš.gigir	12 udu-bg
		La-la-ĝu ₁₀	18 udu-bg
		Ba-zi-ge	2 udu-bg

		Ur-d.Dumu-zi-da	19 mäs
		sà bal-a	32 udu-bĝ
			26 mäs
PIOL 19 95	AS 5 I	Inim-d.Šarā ga-fl	1 ud5
TENUS 181	AS 5 III	A-lu5-lu5	1 mäs
SACT 2 222	AS 5 IV	An-na-ĥi-li-bi	1 udu-niga
SACT 2 224	AS 5 IV	KAS4	1 u8 é-gal
Aeg 26 13	AS 5 VI	An-na-ĥi-li-bi	1 u8
ŠA XCVII	AS 5 VI	Inim-d.Šarā ga-fl	2 ud5
BIN 5 200	AS 5 VI	Ur-ru	1 udu-níta-kur-ra
MVN 5 33	AS 5 VII	Lugal-á-zi-da	1 ud5 mar-tu
RA 49 18	AS 5 IX	Igi-pés	1 udu-niga
CTNMC 32	AS 5 IX	Kù-ga-ni	1 udu-níta
TENUS 179	AS 5 IX	Ur-ru	1 u8-kur-ra
			1 udu-níta-kur-ra
TENUS 85	AS 5 IX	Ur-ru	3 u8-kur-ra
MVN 5 36	AS 5 X	Lugal-mas-su	1 ud5
			1 ašgar
SNAT 361	AS 5 X	Ur-ru	1 udu
			1 udu níta
SNAT 362	AS 5 X	Níg-du10-ga-ĝu10	1 u8
MVN 4 85	AS 5 XI	Ĝiri-ni-ì-tuš	1 u8
			2 udu-níta
TENUS 86	AS 5 XI	Ur-ru	2 u8
Aeg 27 24	AS 5 XI	An-na-ĥi-li-bi	1 udu-niga
Aeg 27 23	AS 5 XII	NE-da	3 udu-níta
Boson 70	AS 6 I	A-lu5-lu5	1 udu
PIOL 19 298	AS 6 I	KAS4	12 udu
			1 mäs
MVN 5 43	AS 6 I	Ur-d.Utu	1 ud5
SACT 1 108	AS 6 I	Ur-ru	1 sila4-níta-kur-ra
GDD 352	AS 6 II	A-lu5-lu5	1 mäs
Orient 16 91	AS 6 IV	An-na-ĥi-li-bi	1 sila4
SACT 2 223	AS 6 IV	NE-da	1 udu-niga
MVN 4 89	AS 6 V	Lú-d.Utu	1 udu-kur-ra
ASJ 12 36 5	AS 6 V	A-lu5-lu5	1 sila4
SACT 1 109	AS 6 VII	An-na-ĥi-li-bi	1 udu-niga-sig5-bĝ
SACT 1 110	AS 6 VII	Lugal-á-zi-da	5 udu-bĝ
			1 udu-niga-bs
SACT 2 226	AS 6 VII	Ur-d.Utu	1 u8
MVN 13 851	AS 6 VII	Lugal-á-zi-da	1 udu-niga
MVN 4 81	AS 6 VIII	Ur-ru	1 udu-kur-ra
PIOL 19 115	AS 6 VIII	Lugal-á-zi-da	4 udu-niga-bs
Cooper 38	AS 6 X	A-lu5-lu5	3 udu-ú
TENUS 178	AS 6 XI	An-na-ĥi-li-bi	1 udu
MVN 4 82	AS 6 XI	Ĝiri-ni-ì-tuš	1 udu-níta-gi6
			1 ud5
			1 u8-gi6
MVN 5 49	AS 6 XI	Kù-ga-ni	1 udu
MVN 4 87	AS 6 XI	Níg-du10-ga-ĝu10	1 u8
			1 udu-níta
SACT 2 216	AS 6 XI	Šu-Eš4-tár	1 u8
CTMMA 1 34	AS 6 XI	An-na-ĥi-li-bi	1 udu
GDD 362	AS 6 XII	An-na-ĥi-li-bi	1 udu-níta
SET 146	AS 6 XII	Ĝiri-ni-ba-tuš	1 udu-níta
SET 147	AS 6 XII	Ĝiri-ni-ì-tuš	1 u8
			1 udu-níta
SACT 2 219	AS 6 XII	Kù-ga-ni	1 udu
			1 mäs
Orient 16 93	AS 6 XII	Kù-ga-ni	2 udu
			1 mäs
SACT 2 218	AS 6 XII	Ma-an-sum	1 ud5-mar-tu
MVN 5 52	AS 6 XII	Šu-Eš-tár	3 u8
			2 udu-níta

SACT 2 220	AS 6 XII	Ur-ru	1 udu-níta-kur-ra
SACT 2 217	AS 6 XII	Ur-ru	3 u8-kur-ra-bs
			1 udu-níta-kur-ra-bs
ŠA C	AS 6 XIII	An-na-ĥi-li-bi	1 udu
SACT 1 111	AS 6 XIII	Ĝiri-ni-ì-tuš	1 u8-gi6
Rochester 197	AS 6 XIII	Kù-ga-ni	1 udu
SACT 2 249	AS 6	Níg-du7-pa-è	222 udu-bs
			51 mäs
	AS 6	Ur-d.[]	132 udu-bs
			39 mäs
			72 sila4-x
	AS 6	Hé-šag-ge	65 udu-bs
	AS 6	Igi-tur-tur	144 udu-b[s]
	AS 6	Lugal-[]	55 udu-b[s]
	AS 6	Šeš-kal-la	84 udu-b[s]
	AS 6	Ab-ba-gi-na	86 udu-b[s]
			2 mäs
	AS 6	NE-da	43 udu-bs
	AS 6	Lugal-úr-ra	131 udu-bs
			48 mäs
	AS 6	Šà-kù-sig17	57 udu-bs
	AS 6	La-la-ĝu10	4 udu
			3 mäs
Rocznik 11 7	AS 7	Lugal-é-maĥ-e	2 mäs
SACT 1 115	AS 7 I	Lugal-á-zi-da	1 mäs
SACT 2 227	AS 7 I	Šu-Eš-tár	2 u8
RA 49 17	AS 7 II	Lugal-mas-su	1 ud5
MVN 4 86	AS 7 II,III	Lú-d.Utu	3 u8-kur-ra
	AS 7 II,III	Lú-d.Utu	3 u8-kur-ra
MVN 4 88	AS 7 IV	Ur-ru	1 udu-níta
Gordon SC 20	AS 7 IV	Ur-ru	1 udu-níta-kur-ra
Cooper 33	AS 7 V	Kù-ga-ni	2 udu
PIOL 19 148	AS 7 VI	Šu-Eš-tár	2 u8
Rochester 198	AS 7 VI	Lú-d.Utu	1 u8 kur-ra
CTMMA 1 35	AS 7 VI	Lugal-mas-su	3 ud5
			1 mäs gal
Forde 58	AS 7 VII	Ur-ru	1 u8-kur-ra
Forde 51	AS 7 VII	Ur-ru	1 kir11
Aeg 26 8	AS 7 VII	Kù-ga-ni	1 udu
MVN 4 92	AS 7 VII	Níg-du10-ga-ĝu10	1 u8-kur-bĝ
Atiqot 4 31	AS 7 VIII	Níg-du10-ga-ĝu10	1 u8-bs
			[n udu]-bĝ
			1 sila4-níta-bĝ
			2 sila4 ù-tu-da
MVN 1 128	AS 7 VIII	Níg-du10-ga-ĝu10	1 u8
PTST 179	AS 7 VIII	Lú-du10-ga	1 ud5
UCP 9/2 22	AS 7 VIII	Ur-ru	1 udu-níta-bĝ
PIOL 19 301	AS 7 VIII	Lugal-mas-su	5 ud5
PIOL 19 146	AS 7 IX	Kù-ga-ni	1 udu
ŠA XC	AS 7 IX	Kù-ga-ni	1 udu
Orient 16 94	AS 7 IX	Šu-Eš-tár	1 udu-níta
MVN 4 90	AS 7 IX	Ur-ru	2 u8-kur-ra
Rocznik 11 8	AS 7 IX	Ur-ru	2 u8-kur-ra
			1 sila4-níta-kur-ra
Gordon SC 22	AS 7 IX	Ur-ru	3 u8-bĝ
			1 udu-níta-bĝ
			1 sila4-bĝ
MVN 1 129	AS 7 IX	Níg-du10-ga-ĝu10	3 u8-bĝ
			4 udu-níta-bĝ
MVN 4 93	AS 7 IX	Níg-du10-ga-ĝu10	1 u8-bĝ
			1 sila4 ù-tu<-da>
Boson 342	AS 7 X	Kù-ga-ni	2 udu
SACT 2 230	AS 7 XI	Kù-ga-ni	1 udu
PIOL 19 96	AS 7 XI	Lú-d.Utu	3 udu-níta

MVN 5 62	AS 7 XI	Lugal-mas-su	1 ud5
SACT 2 231	AS 7 XII	Níg-du10-ga-gu10	1 ug-bs
AnOr 7 211	AS 7 []	A-lu5-lu5	1 udu
Atiqot 4 33	AS 7		42 ug
			127 udu-níta
TPTS 183	AS 8 I	Ma-an-sum	2 ud5-gan-na
SACT 2 234	AS 8 IV	A-lu5-lu5	1 sila4
SACT 1 116	AS 8 X	NE-da	6 udu
			1 mäs
SACT 2 215	AS 8 XI	Ur-ru	2 sila4
TENUS 183	ŠS 1 VI	Ma-an-sum ga-fl	1 ud5
MVN 14 274	ŠS 2	Uš-mu	5 udu-niga-bg
			6 mäs
			2 udu-niga-bs
			13 ug-bg
			32 udu-ú-bs
			4 sila4-bg
			4 sila4-ga
SET 150	ŠS 2 I	Lugal-á-zi-da	1 udu-níta
SET 151	ŠS 2 III	A-lu5-lu5	1 sila4
SET 153	ŠS 2 V	A-lu5-lu5	1 udu-bs
SET 154	ŠS 2 VI	A-lu5-lu5	1 udu-bg
Atiqot 4 38	ŠS 2 VI	Ur-d.Ma-mi	1 udu-niga-sig5-bs
SET 155	ŠS 2 IX	A-lu5-lu5	1 udu
SET 156	ŠS 2 IX	A-lu5-lu5	2 udu
SET 157	ŠS 2 X	A-lu5-lu5	8 udu
SET 159	ŠS 2 XI	A-lu5-lu5	1 sila4
			1 mäs
SET 158	ŠS 2 XI	A-lu5-lu5	2 sila4
			1 mäs
MVN 14 496	ŠS 3 III	Lú-d.Utu	1 ug-kur-ra
SACT 2 235	ŠS 3 III	Níg-du10-ga-gu10	1 udu
AnOr 1 196	ŠS 3 V	NE-da	1 udu
MVN 14 320	ŠS 3 XII	IM-a-ni	1 ug
MVN 14 389	ŠS 3 XII	Lú-kal-la sipa	1 ug
			1 udu-níta
			1 mäs-níta
AnOr 7 364	ŠS 3 []	Šeš-kal-la	1 ug-bs
			1 udu-níta-bs
TPTS 154	ŠS 4 I	Lugal-mas-su	2 ud5
TPTS 178	ŠS 4 IV	A-lu5-lu5	5 udu-kur-ra
AnOr 1 204	ŠS 4 VIII	An-na-ḫi-li-bi	6 udu
			1 mäs
SACT 2 239	ŠS 4 IX	A-lu5-lu5	1 udu
SACT 2 238	ŠS 4 IX	A-lu5-lu5	1 udu
TPTS 181	ŠS 4 X	UŠ-gu10	1 udu
TENUS 184	ŠS 4 XI	A-lu5-lu5	2 udu
SACT 2 237	ŠS 4 XII	A-lu5-lu5	1 udu
GDD 206	ŠS 6 II	Ur-d.Išaran	3 ug
MVN 14 458	ŠS 6 IX	Ur-d.Nin-SU	1 ug-kur-ra
			1 udu-níta-kur-ra
GDD 449	ŠS 6 XII	Šeš-kal-la	1 ug-bs
MVN 13 576	ŠS 8 X	Ur-d.Nin-SU	3+ udu-kur-[ra]
MVN 14 493	ŠS 9 X	Ur-d.Utu	1 udu
BIN 5 201	[] X	UŠ-gu10	2 udu

bg=bar-gál; bs=bar-su-ga

21 Kleinvieh in den Fallurkunden aus Umma

78	udu	Widder
247	udu-bar-gál	Vollvlieswidder
1107	udu-bar-su-ga	Leervlieswidder
3	udu-ú	Graswidder
32	udu-ú-bar-su-ga	Leervliesgraswidder
13	udu-kur-ra	Grossschwanzwidder
93	ug	Mutterschafe
27	ug-bar-gál	Vollvliesmutterschafe
6	ug-bar-su-ga	Leervliesmutterschafe
2	ug-gi6	schwarze Mutterschafe
20	ug-kur-ra	Grossschwanzmutterschafe
1	ug-kur-ra-bar-gál	Vollvliesgrossschwanzmutterschaf
3	ug-kur-ra-bar-su-ga	Leervliesgrossschwanzmutterschafe
157	udu-níta	Widder
7	udu-níta-bar-gál	Vollvlieswidder
7	udu-níta-bar-su-ga	Leervlieswidder
1	udu-níta-AŠ.UR4	Erstraufwidder
1	udu-níta-gi6	schwarzer Widder
81	sila4	Bocklämmer
29	sila4-bar-gál	Vollvliesbocklämmer
4	sila4 ù-tu-da	neugeborene Bocklämmer
4	sila4-ga	Milchbocklämmer
2	kir11	Mutterlämmer
1	kir11-AŠ.UR4	Vollvliesmutterlamm
1	sila4-níta-bar-gál	Vollvliesbocklamm
2	sila4-níta-kur-ra	Grossschwanzbocklämmer
306	mäs	Ziegen
9	mäs-gan-na	
20	uzud	Geissen
16	uzud-gan-na	
2	uzud-mar-tu	Amoritergeissen
1	mäs-gal	Bock
1	mäs-níta	Bock
1	ašgar	Zicklein
5	udu-niga	gemästete Widder
5	udu-niga-bar-gál	gemästete Vollvlieswidder
7	udu-niga-bar-su-ga	gemästete Leervlieswidder
1	udu-niga-sig7-bar-gál	gut gemästeter Vollvlieswidder
1	udu-niga-sig7-bar-su-ga	gut gemästeter Leervlieswidder

22 Botschaftbocklämmer in Texten über Mastschafe für bal

Text	Datum	1 1/2	1 1/3	1	2/3	1/2	1/3	Tage	Fuss
Orient 16 88	AS 5 VII			185				22	Lugal-á-zi-da
"	"	120		65				8	
"	"						10	23	
Aeg. 26 12	AS 5 VII			185				22	Igi-pés
"	"	120		65				8	
"	"						10	23	
SACT 2 261	AS 5 VIII	120		65			10	30	Igi-pés
Aeg 26 19	AS 5 IX	130		65+18				<30>	Lugal-á-zi-da
Nikolski 385	AS 5 IX	130		65			10	<30>	Igi-pés
PIOL 19 17	AS 7 V		215		15			29	Lugal-á-zi-da*
SACT 2 265	ŠS 2 V	240		90				29	-
Boson 60	ŠS 3 VI	120		36			30	30	Lugal-á-zi-da
An Or 1 176	ŠS 3 VI					25		30	-
BIN 5 291	ŠS 3	110		93		75		3	NE-da
MVN 14 275	ŠS IV	120		70		30		29	-
CST 787	ŠS 4 V	120		67		30		30	-

1 1/2 etc. sind Liter Gerste. Die mit 1 1/2, 1 1/3 und 1 Liter Gerste gefütterten Tiere sind gemästete Widder; die 18 in Aeg. 26, 19 sind Böcke (mäs-gal); die mit 2/3, 1/2 und 1/3 Liter Gerste Gefütterten sind Botschaftbocklämmer; in Nikolski 385 werden sie einfach Bocklämmer genannt.

* Lugal-á-zi-da nicht als Fuss bezeichnet.

BIBLIOGRAPHICAL ABBREVIATIONS

See in general M. Sigrist & T. Gomi, *Comprehensive catalogue of published Ur III tablets* (CDL: Bethesda; 1991).

Akk	<i>Akkadica</i>
CCTB 1	P. J. Watson, <i>Catalogue of Cuneiform Tablets in Birmingham City Museum</i> 1, Neo-Sumerian Texts from Drehem (1986)
CCTB 2*	noch nicht erschienen
Cooper	M. Cooper, <i>The Dyke College Texts</i> ASJ 7 (1985)
DC	J.-M. Durand, <i>Documents Cunéiformes</i> (1982)
Emory	D. Snell, <i>The Ur III tablets in the Emory University Museum</i> ASJ 9 (1987) 203ff.
GDD	N. Schneider, <i>Orientalia</i> 47–49 (1930)
JCS 23	D. I. Owen und G. Young, <i>Cuneiform texts in the Zion Research Library</i> (1970) S. 95ff.
JCS 24	D. I. Owen, <i>Neo-Sumerian texts from American Collections</i> (1971) 137ff.
Lager*	D. Snell in YOS 18
Molina	M. Molina Martos, <i>Tablillas neosumerias del Museo Bíblico del Seminario Diocesano de Palma de Mallorca, Aula Orientalis</i> 8 (1990) 69ff.
RA 49	H. Limet, (1955) 69ff.
RA 79	M. Van de Mieroop, <i>Cuneiform tablets from the Toledo Museum of Art</i> (1985) 17ff.
Rochester	M. Sigrist, <i>Documents from tablet collections in Rochester, New York</i> (1991)
Rocznik 11	S. Szachno-Romanowicz, (1935) 79ff.
SNAT	Gomi, T. und Sato, S. <i>Selected Neo-Sumerian administrative texts from the British Museum</i> (1990).
Talon I	P. Talon, <i>Akkadica</i> 7 (1978) 14ff.
TCNSD	A. Archi und F. Pomponio, <i>Testi Cuneiformi Neo-Sumerici da Drehem</i> (1990).

SHEEP AND GOAT HERDING ACCORDING TO THE
OLD BABYLONIAN TEXTS FROM UR

Marc Van De Mieroop

(Columbia)

1 Introduction

Sheep and goat herding was a very important economic activity around Ur, in antiquity the largest city in the very south of what is now Iraq. Even today, when the region is part of the Arabian desert, it sustains large herds of animals. In antiquity when extensive tracts of land were irrigated, the possibility to graze animals must have been even more extensive. The area is actually of limited suitability for cereal agriculture because of poor drainage, and this must have made animal husbandry a more desirable activity. Ur's prominence as a herding center can be seen in the late third millennium from the textile texts found at the site; these texts document an extensive weaving industry which was based on wool that was locally obtained. In the early second millennium material from the site, the textile industry is almost entirely undocumented, which is not to be interpreted as an indication that the industry had been terminated, but has to be blamed on the accident of recovery of the texts. On the other hand, the documents of the early second millennium are very explicit about the raising of the animals themselves, and these texts will be used as the basis of this study.

2 The sources

There are two archives from Ur that deal explicitly with the herding of sheep and goats. One derives from the illicit digs that took place on the tell before the excavations by Sir Leonard Woolley started in the 1920's. Hence it is impossible to determine its archeological context. Internal evidence from the texts, however, show that they derive from a central archive from the temple administration. The preserved texts cover the period from Sîn-iddinam 5 (1845) to Warad-Sîn 10 (1825)¹ (see appendix 1), and most of them were published in YOS 5. The second archive was found during Woolley's excavation of the so-called AH site, in the house named No. 1 Broad Street by him. The texts from that house were not found as actual archives, but had been deposited in the building as fill during one of its restorations (Charpin 1986: pp. 482–5). Hence it is impossible to determine the original provenance of these tablets as well. The archive in its present state covers the period from Sîn-iqīšam 5 (1836) to Rīm-Sîn 12 (1811) (see appendix 2).

The relationship between the two archives is difficult to ascertain. They are partly contemporaneous, and include similar documents. For instance, both of them contain records of sheep and goats brought in for plucking and shearing, or receipts of pious gifts of cattle to the temple. The texts from the illicit digs deal with the herds of the Nanna-Ningal temple complex, and some of those from No. 1 Broad Street state this connection as well (UET 5 809). The overlap between the two archives can also be seen in the appearance of some shepherds with the same names in both of them. The clearest case is that of Adad-rabi son of Iddiya. He appears as a low-level shepherd both in the texts from illicit digs and in those from the AH site (YOS 5 4.v.33 [WS 2], YOS 5 13:3 [WS 3], UET 5 809:58 [RS 2], UET 5 725:5–6 [no date]). Several other shepherds with the same name appear in both archives, but the absence of a patronymic prevents us from determining with certainty that the same men are involved.

These connections between the two archives are difficult to explain. It is highly unlikely that the illicit diggers found texts from No. 1 Broad Street, as there are no other connections between the texts from the AH site and the texts that were looted. The main center of activity of the illicit diggers seems to have been just north of the so-called EH site (Charpin 1986: p. 158), thus far from the AH site. The tablets used as the fill for No. 1 Broad Street seem to have been collected from various sites, and it is possible that one of their points of origin was a building in which the tablets published in YOS 5 were discovered.

Both archives deal with the herds themselves – primarily accounting for losses of animals – and with their products. It is interesting to note that cattle were administered in the same texts as sheep and goats, and that the same people were involved with their management. Although it is thus clearly an artificial distinction that was not made by the Ur administration, I will only treat the sheep and goats in this contribution. It will be necessary, however, to refer to cattle products in some places as the material relating to sheep and goats is too fragmentary to be understood on its own.

3 The animals

The terminology used in the Ur documents to distinguish between different breeds and age groups of sheep and goats is rather limited. This is not necessarily an indication that the shepherds were unaware of these differences, but must be seen as a result of the purpose of the texts in the preserved archives. They deal with sheep and goats that were kept for their renewable products, especially their wool or hair. Sheep wool was plucked, while goat hair was cut. The central administration had these products in mind when the accounts were drawn up, and distinguished only between groups of animals that produce different amounts of these products. Moreover, the temple held the shepherds only accountable for certain parts of their herds, and the animals that made up those parts are the ones that we find in the texts. There is a difference in the terminology used for sheep and that used for goats, hence I will treat them separately.

a) Sheep The commonly found terms are:

female	male
u ₈ “ewe”	udu-nita “ram”
kir ₁₁ -aš-ur ₄ “shearling”	sila ₄ -aš-ur ₄ “shearling”
kir ₁₁ -gub “weaned(?) sheep”	sila ₄ -gub “weaned(?) sheep”
kir ₁₁ -ga “suckling lamb”	sila ₄ -ga “suckling lamb”

“Suckling lambs” are only rarely mentioned, as has been noted previously (Postgate 1977: pp. 12–3). In accounts of plucking this can be easily understood as resulting from the fact that such animals could not yet be plucked. What is more surprising, in my opinion, is the rarity of these animals in the accounts of losses that had occurred in the herds and that had to be reported by the shepherds to the central institution. In only two of these accounts mention is made of “suckling lambs,” and then in exceptional cases as well. In YOS 5 4, an account that records the loss of 1,632 sheep, only ten female and nine plus a broken number of male lambs are recorded (i.33–4, ii.41–3, v.28–30, vi.36, vii.18–9). It is remarkable that they only appear in so-called a-ru-a-herds, a term to be discussed later. The same restriction appears also in the second text that lists losses of suckling lambs: YOS 5 17 is a record of the losses among animals given to the temple during the festival of the first fruit, and suckling lambs appear among them (lines 2, 8, 9, 16). All other references to suckling lambs are in records of gifts to the temple (YOS 5 20; 34;

45). It is also remarkable that in all but one herd the suckling lambs appear when “shearlings” (cf. below) are not mentioned (YOS 5 4; 17). Only once, in YOS 5 2 iii 43, nine suckling lambs are listed after full-grown animals and “shearlings,” and then only in a long list of herds. It seems that suckling lambs were ignored by the central administration when dealing with herdsman, both when the herds were plucked and when the shepherds had to account for their losses. Only when no “shearlings” were lost (or present in the herds) were the suckling animals counted.

It is unlikely that the central administration did not care about the loss of animals in their first year of life. How can we explain this omission then? We know from texts from Larsa, a city some 30 kilometers from Ur, that shepherds were supposed to increase the size of their herds by 80 lambs per 100 ewes every year (Kraus 1966: pp. 24–6). Although at Ur we have no such goals stated in the texts, we can assume that a similar increase was required. If the newborn animals were not counted by the central administration, it must indicate that the herd increase was only calculated when the animals were first plucked. This suggests that the shepherd was not only responsible for a certain percentage of herd increase at the time of lambing, but that he also had to make certain that not too many lambs died of natural causes during their first year of life. The owners of the herds were thus free of risks in the first year of the animals’ lives, when the mortality rate must have been high. The shepherd had to make certain that the increase of his herd was large enough to reach the quota after a number of suckling animals had been lost in their first year of life (cf. Kraus 1966: pp. 59–61).

The next stage in the growth of the sheep recorded in the text is designated by the term aš-ur₄, literally “one + plucked”. The reading of this term has been a mystery for a long time, and Kraus (1966: pp. 23–4) refrained from reading the sign at all, using X instead. He did suggest the translation “shorn lamb,” however. Heimpel pointed out during the SAG meeting in Barcelona that the term has to be equated with the Akkadian term *iltennû baqnu* “plucked once” which is found in the Nuzi texts (CAD B: p. 98a s.v. *baqāmu*, cf. Morrison 1981: p. 272), and this simple solution is almost certainly correct. It is not easy to determine when a sheep reached this stage, however. The plucking of animals took place in the last month of the Babylonian year, i.e. February/March. Lambing probably took place in the fall or winter, although this is not certain.² Suckling lambs (i.e. up to five months old) were not plucked. The aš-ur₄-animals therefore must have been more than a year old, probably some 16–17 months, when they were ready for their first plucking. Their fleece must have been longer than that of animals that had been plucked the previous year, which probably accounts for the fact that they are mentioned separately in the texts. I would suggest the translation “shearling” for the term kir₁₁/sila₄-aš-ur₄, as the modern-day “shearlings” are at a similar stage in their lives.

The term aš-ur₄ can, however, be replaced by the term gub, which is usually translated as “weaned” (Steinkeller, BSA Vol. 8) or as “sexually mature” (Landsberger 1960: p. 55, CAD L: pp. 188b-9a s.v. *lillidu*). These are actually two entirely different stages in a sheep’s growth. A domesticated sheep suckles for three to five months after which it is weaned. It becomes mature only between one and two years of age, and most sheep will breed at an age of about nineteen months (*Encyclopedia Americana*, International Edition 1990, Vol. 24: p. 683b). As far as I can see the evidence for neither translation is conclusive. The term gub is rare in texts from southern Babylonia, but quite common in those from the north (Postgate 1977: p. 11). In Ur the terms aš-ur₄ and gub seem to be mutually exclusive, and gub never appears in plucking accounts.³ These animals only appear in texts when they are lost by the shepherd or when they are given as an offering to the temple (e.g. YOS 5 45:1–2; 48:2, 6–7; 64:2–4; UET 5 818:3). The animals must have been older than sucklings, hence more than five months old, and they must have been close

in age to the "shearlings" as can be seen from the sequences $u_8 \dots kir_{11}$ -gub ... $udu-nita \dots sila_4$ -aš-ur₄ in YOS 5 3.i.30-1 and $u_8 \dots kir_{11}$ -aš-ur₄ ... $udu-nita \dots sila_4$ -gub in YOS 5 3.ii.9 and 15.iv.6-7. But they had not been plucked yet, either because they were too young or because the shepherd had somehow missed their first plucking season. Their youth may have been due to the fact that they had been spring or summer lambs. We actually encounter the latter term once at Ur. In UET 5 111, a plucking account dated in the last month of the year, twelve animals are referred to as $sila_4$ -buru₁₄ "lambs of the harvest time," i.e. the spring (lines 23-4). Of these animals four are said to have been left "unplucked" (bar-gál). These spring or summer lambs were probably between ten and seven months old and some of them must have been too young to be plucked, but too old to be left unaccounted for by the administration. But spring and summer lambs cannot be the only ones indicated by the term $kir_{11}/sila_4$ -gub. It is remarkable that these animals are never found in the same herds as "shearlings," and if age were the only difference this would force us to assume that all animals of a particular herd were either summer or winter lambs. Thus, it seems likely that gub also can indicate animals that were old enough to have been plucked, but that were never plucked at the time that they died or were given as an offering. The shepherd might have been unable to lead his herd to the plucking area and the animals kept their fleece for two years. Thus all sheep between the ages of five months and two years were designated with the term gub. Those among them that had been plucked, were distinguished by the term aš-ur₄. The reason why gub is common in texts from northern Babylonia may be connected to the purpose of the texts from that region. These are consignment texts where animals were assigned to shepherds for herding, and where wool was not at issue.

Two years after its birth a sheep must have been considered full-grown (u_8 "ewe", $udu-nita$ "ram") and it kept the same designation for the rest of its life. Probably the majority of the male animals were wethers, but we have no evidence about when castration was performed and how many animals were subjected to it.

In one plucking account a few animals seem to have been brought in already plucked (bar-sù-a, UET 5 809:33, 35, 61, 63⁴). They were accounted for although they had already lost their fleece, as these accounts also inform the administration about the size of the herds. There is an unclear relationship between these plucked animals and the SA.GAZ, the nomadic outcasts of Old Babylonian society. They seem to have been given to these people as food (YOS 5 33; 37⁵) and must have been plucked before they were sent out. In the plucking account UET 5 809:61 and 63 is possibly to be read lu SA.GAZ (Butz 1973-74: p. 26 n. 43). Does this indicate that the animals were not brought to the plucking area, as they had been directly given to the SA.GAZ, and the shepherd brought in their fleece? Also when animals were donated to the temple, they can be said to be without a fleece (YOS 5 20:1, 3; 43:2; 49:5). The only other special indication found is "long fleeced ram" found only twice (UET 5 111:17; 817:7).

b) Goats The goats are distinguished by the following terms:

female	male
uzud "doe"	máš-gal "buck"
$máš-gàr$ -gub "weaned(?) young doe"	máš-gub "weaned(?) young buck"
$máš-gàr$ -ga "suckling female goat"	máš-ga "suckling male goat"

The goats are most often referred to in their adult state, as "doe" or "buck." These terms appear both in shearing accounts and in lists of dead animals. Only rarely do we find the terms $máš-gàr$ -gub and маш-gub, referring to younger animals. It is impossible to determine what the

approximate age of these animals would have been, but it seems probable that the goats were of the same age group as the sheep referred to as $kir_{11}/sila_4$ -gub. The latter animals were not plucked although older than suckling animals, thus between five months and two years old. Once shorn goats are not attested in the Old Babylonian texts from Ur, although such a designation exists in the texts from Nuzi (CAD G: p. 60b s.v. *gazzu*, cf. Morrison 1981: p. 272). This may be due to the fact that goats were not shorn in their second year, when they had ceased to be counted as suckling animals. There was a need to account for them, however, even though they did not yield hair. The designation gub appears very rarely in our texts, which may be an indication that animals of this type were difficult to distinguish from full-grown animals.

Suckling goats are almost entirely absent from the documentation from Ur. They never appear in shearing accounts or in accounts of dead animals. We only find them when they are donated to the temple (YOS 5 42:16-7) or when animals are issued for offerings (YOS 5 17:9). Just as for the suckling lambs the shepherd must not have been required to account for suckling goats.

The only additional designation found with goats refers to pregnancy: in UET 5 816:4 one of eleven young does is said to be pregnant (11 $máš-gàr$ šà-ba 1 *eritum*) and in UET 5 815:6 one doe is possibly pregnant (1 uzud šà-ba?). The classification of goats is thus more limited than that of sheep, but this is a logical consequence of the rarity of goats attested in the texts.

4 The herds

Herds of sheep and goats were kept together. The number of sheep was always much higher than that of goats, as can be seen from Tables 1 and 2. The goats' rarity in plucking and shearing accounts was because they were rare, not because only a few goats were shorn. That can be ascertained from the lists of dead animals (cf. Table 2) where the relative scarcity of goats is the same as in the plucking and shearing accounts. We can obtain a good idea of the compositions of the herds from the accounts of animals brought in for plucking and shearing, an activity that took place in the last month of the year. Table 1 lists the numbers of animals found in all of these accounts. It is interesting that the herds include usually more rams than sheep. Also in the accounts of losses rams usually slightly outnumber ewes. In my opinion this indicates that the slaughtering of animals was extremely limited if not entirely absent. No shepherd would prefer to slaughter female over male animals, as the maximum fertility of a herd can be obtained with only one ram per five ewes (Barth 1961: p. 6). These flock compositions at Ur are in sharp contrast with the figures available from northern Babylonia somewhat later in the Old Babylonian period.⁶ There the female animals outnumber the male ones in almost every herd, and the males must have been slaughtered for their meat.

It is impossible to determine the total number of animals that were herded around Ur. Although the texts from the illicit digs give detailed accounts of parts of the herds in the possession of the Nanna-Ningal temple complex, the information is insufficient to estimate how many animals were in the temple's possession at one point in time. Some vague idea can be obtained from the following numbers. In the twelfth month of Silli-Adad's only regnal year, twelve shepherds brought in 7,715 sheep and 103 goats for plucking and shearing. For the preceding year the names of ninety-one shepherds are known in the Nanna-Ningal complex. These numbers are, however, not a firm basis for an estimate of the herd sizes, as the number of sheep per shepherd can vary from 106 to 1,002. In two articles Butz has argued for a total number of animals that was above 40,000, but both estimates were based on false assumptions

and a misreading of the texts. In 1973–74: p. 28 he used the amounts of losses recorded in four texts dated to the year Sîn-iqīšam 5 (YOS 5 1; 2; 3; and 18): these losses amount to about 3,910 animals. He then assumed that about 11% of the herds was lost every year, and this would suggest a total number of animals of more than 40,000. It is, however, false to assume a standard relationship between the amounts of loss and the herd sizes, as can be seen from a comparison of a plucking account and an account of losses, both dated in the last month of the year Warad-Sîn 2 (YOS 5 30 and 4):

shepherd	counts	losses	percentage
Ubār-Sîn son of Warad-Sîn	1,222	80	6.5
Aḫī-šagiš	3,661	50	13.8
Awil-ilī son of Kana'a	493	16	3.2
Sîn-balāṭī	208	4	1.9
Makkur-Sîn	1,007	64	6.3
Ea-hegal	646	70	10.8

Although the amounts of losses do indeed indicate that the herds were enormous, their numbers cannot be used to give an estimate of the size of all herds at Ur. In Butz 1973–74: pp. 35–7 and 1979: p. 347 the author arrived at the same figure of 40,000 animals based on the text YOS 5 102, which he interpreted as a record of wool deliveries. He calculated that 25 tons of wool were recorded in the text, but this was based on a misunderstanding of the document. The product accounted for is unfortunately not indicated (although is most likely barley), but we can say with certainty that it is not wool, a product measured by weight. We do not have here an otherwise unattested sequence of “Gross-Talent” (= 5 talents), talent, and an unexplained measure, as suggested by Butz, but a normal sequence of measures of contents: 1 gur = 5 nigida = 30 bán = 300 sila. The unusual feature about the measures is that the bán is written with *Winkelhaken* in the individual entries. In the totals on lines 16 and 30 the measures are written in the way that was common for measures of contents in Old Babylonian Ur. Although both the relationship between the individual entries and the totals and the identity of the product recorded remain unclear, it is certain that this text is not a record of wool. Thus, both Butz’s approaches to an estimate of the total number of sheep around Ur are mistaken.

Be this as it may, the figures do suggest that a large number of sheep was administered in Ur. Besides the animals owned by the Nanna-Ningal temple complex, there is some evidence for herds owned by private individuals (cf. UET 5 257), but nothing allows us to determine how common that practice was.

5 Administration

Only for the herds of the Nanna-Ningal temple complex do we have sufficient information to talk about their administration. During the two and a half centuries that are documented in our sources, we can see an evolution in the way the temple managed its possessions. That evolution is not restricted to animal husbandry, but applies to the entire temple economy. This is not the place to discuss the changes in their entirety (see Van de Mieroop 1992), and I will only deal with the management of the temple herds. The basic care of the animals remained the same for the entire period, but the way the animal products were disposed of evolved.

The enormous herds belonging to the Nanna-Ningal temple complex were not herded by temple dependents, but were assigned to private shepherds who combined the care of their own

herds with that of the temple animals. The temple drew up an agreement with the shepherds about the care of its herds. Although these contracts themselves are not preserved, we have at our disposal a number of tags that were attached to baskets containing these records. These tags can be divided into three groups. The first group refers to agreements with the shepherds, and accounts of sheep entered for plucking:

e.g. YOS 5 59:

gi-pisan im-s[ar-ra]	Basket with tablets:
im KA-kešda	contracts
u ₈ -udu-ḫi-a	of ewes and rams
ŠID-si-ga ku ₄ -ra	entered for plucking,
ù lá-ni u ₈ -ḫi-a	and of arrears of ewes.
šu ša-tam-e-ne	Authority of the šatammū.
XII/ - /Sîn-erībam 2 (1841).	

Other examples of this type of tag are YOS 5 55, 57, and 60. The basket must have contained texts assigning animals to shepherds (KA-kešda), now all lost, plucking accounts such as YOS 5 9, and accounts of the arrears of the shepherds, such as YOS 5 15.

The second group of tags was attached to baskets containing records of lost animals. The only example is

YOS 5 63:

gi-pisan im-sar-ra	Basket with tablets:
kuš-u ₈ -udu-ḫi-a	of the hides of ewes and rams
RI.RI-ga	dead of natural causes,
mu-túm	that were delivered
sipa-e-ne	by the shepherds.
gír A-ḫu-ki-nu-um ú-túl	Via Aḫu-kīnum, the head-shepherd.
itī I-ta	from month I
itī XII-še	to month XII.
Warad-Sîn 3 (1832)	

Records that were stored in the basket were of the type of YOS 5 3.

The third group of tags refers to records of pious gifts to the temple. The only example is YOS 5 61:

gi-pisan im-sar-ra	Easket with tablets:
im li-um	records
u ₈ -udu-ḫi-a	of ewes and rams
áb-gu ₄ -ḫi-a	cows and oxen
a-ru-a didli ša uru ^{ki}	as individual gifts in the city
ù kaskal [gír] má-nisag-gá	and on occasion of the procession of the first fruits,
[i]-dab ₅ sipa-e-ne	received by the herdsmen.
[šu] é ^d Nanna	Authority of the Nanna temple.
XII/14/Warad-Sîn 3 (1832).	

The records in this basket must have been of the type of YOS 5 48. These tablet basket tags indicate that the care of the herds was farmed out to a number of herdsmen who had certain

obligations, and whose activities were monitored and recorded. The actual terms of the agreement are not stipulated in any of the documents at our disposal but we can reconstruct them from the records that are preserved. The temple animals were mixed with those privately owned by the herdsman. This can be seen from the fact that when the shepherds were in arrears with their required quota for herd increases they could compensate for the loss with their own animals. This system obviously guaranteed optimal care of the temple herds. The excess production of the herds remained the property of the herdsman who had everything to gain by taking good care of the animals. The temple required a certain annual increase. The Ur material does not state what that number is, but in Larsa the palace demanded 80 lambs per 100 ewes and we can assume that a similar number was required in Ur. If the shepherd was able to increase the herd by more animals than was required of him, he was allowed to keep them in his own herd. When he was unable to reach that quota he could repay the temple with animals from his own flock, or with payments in silver, or sometimes even with a slave (YOS 5 15). There was also an allowance for a certain loss of animals, due to diseases, cold, and attacks by wild animals. Part of the herds were consumed, but these numbers were kept very low, as can be seen from the fact that the temple preferred to buy a sheep from a private herd, rather than using its own property for an offering.⁷

There were seemingly two types of herds. Usually the records do not indicate anything special about the herds, but once in a while a distinction is made between an *a-ru-a*-herd and a *nam-en-na*-herd, both in the care of the same shepherd. The designations often, although not always, appear together.⁸ When no specification is given it is likely that the herd belongs to one of these two groups, but it is impossible to guess which one. The interpretation of these terms is not clear. Butz 1973–74: p. 22 n. 38 suggests that *nam-en-na* refers to the “herds of the *en*-priestess”, and, as far as I can see, he does not translate *a-ru-a*. His translation of *nam-en-na* is to be doubted, however. The term appears also in the Ur III texts from Umma and Drehem, where the existence of *en*-priest is not confirmed. Waetzoldt 1972: pp. 31–2 discussed the term under the heading “Hirtentätigkeit”, and saw in it a type of contractual obligation. The phrase *nam-en-na-še KA ba-ab-kešda* “(the shepherd) is bound to the *nam-en-na*-activity” clearly points towards that translation. In the Ur III texts the *nam-en-na* is probably to be contrasted to the term *DU.DU* (ibid.: pp. 32–3). In the Old Babylonian texts from Nippur *nam-en-na* is used in opposition to *ní-te-na* (e.g. PBS 8/i: 63:25–6). The latter term seems to refer to the shepherd’s own herd, hence the *nam-en-na* may refer to the herd which he agrees to supervise for another owner. In the Old Babylonian Ur texts the opposition of *nam-en-na* with *a-ru-a* would have to refer to something else, however. It seems most plausible to relate the term *a-ru-a* here to the *a-ru-a* institution, the practice of donating objects, people and animals to the temple, ostensibly for pious reasons. Several records of donations of animals are preserved (see appendix 1), and the shepherds receiving the gifts are known from other accounts as being in the employ of the temple. It is possible that the animals donated as *ex-voto*’s to the temples were assigned to the shepherd on a different basis than those that were part of the regular temple herds. Perhaps the *a-ru-a* animals were not subjected to the same quota system as the other ones. The shepherds had to care for them and to acknowledge all losses and births, without having to fulfill a quota. This may explain why suckling lambs are only attested in these *a-ru-a* herds. This is only a suggestion, however, and at present the reasons for this administrative distinction remain unclear.

There were several levels of herdsmen, organized in an hierarchy that used the terms *na-gada* “shepherd,” *níg-šu* “in the care of,” *ì-dab*, “in charge of,” and *ú-túl* “chief herdsman” to indicate the different levels from bottom to top. The lowest level of *na-gada* already represented several unnamed herdsmen, as can be seen from the number of animals they are supposed to herd: up to

1,640 sheep, which seems to me too high a number to be guarded by one man.⁹ The levels of the hierarchy are functions, not titles, as the people responsible for a specific level can vary.¹⁰ Only *na-gada* can be regarded as a broad professional designation. Many of the men appearing in these documents are related to each other as brothers and the profession was often passed on from father to son.

The accounts of the herds were drawn up in the last month of the year, at the time of the plucking of the sheep and the shearing of the goats. At closer intervals accounts were made of animals that had died and whose hides were brought in as proof of their death. Two copies were made: one for the temple administration, the second for the *šatammū*, a group of officials who were appointed within the temple hierarchy to represent the palace’s interest. These documents were seemingly found together during the illicit digs. The presence of the *šatammū* shows the palace’s interest in this important economic resource, but does not indicate that the palace itself owned herds.

Interaction between the owners and the shepherds also took place when the products of the herds were delivered. Unfortunately, we do not have enough documentation about wool, so that the system cannot be reconstructed for the sheep and goat in isolation. But we do have sufficient data about dairy products, which seem to have been mainly derived from the herds of cattle (cf. below). As cattle and sheep and goats were administered by the same people, it is possible to use the information about dairy products and extrapolate from it how all animal products were treated by the temple complex. We see an evolution over the centuries. In texts from the early part of the second millennium, before the reign of Warad-Sîn, deliveries of dairy products were made to the Ganunmah, the center of the temple administration, which at that time also acted as the distribution center of all products needed by the temple. Few texts from that period survive, and very few of them are published at the moment (see appendix 3). But in the Ganunmah was found a six column tablet listing dairy deliveries by individual herdsmen (U2593, unpubl. UM, dated 1918). Some other texts found in the building record the deliveries of various food products, including dairy products (Loding 1976 3; U2622). Small deliveries by individual herdsmen were delivered directly to the institution (cf. UET 5 619), which indicates that it took care of all the details of the administration. From this building the food products were issued to the various destinations, especially offerings (see Figulla 1953) and support of dependent personnel (e.g., UET 5 617, UET 3 1079).

The role of the Ganunmah changed, however, in the time period under discussion here. When Nūr-Adad (reigned 1865–1850) restored the building, he referred to it as “a proper house for ghee and cheese”.¹¹ But when some twenty years later Kudur-Mabuk repaired the Ganunmah in the fourth regnal year of his son Warad-Sîn (1831), he called it “the house of silver and gold”.¹² The change in function of the building seems to have taken place before Warad-Sîn’s reign, however. The most recent text found in the building dates from the first year of Nūr-Adad, and the last mention of the Ganunmah as the point of issue of goods is dated in the second year of Sîn-iddinam (1848). Sîn-iddinam also boasts of having worked on the building,¹³ and it is likely that in his reign the Ganunmah changed from a storage house of agricultural produce to a treasury. The storage of food products had to be done elsewhere, and we are not informed about the whereabouts of that institution. It seems most likely that most of the daily affairs of the temple from then on were taken care of outside its administration, and that this institution only was informed with summary accounts about the status of its herds.

The documents of the two archives do not indicate how the shepherds maintained contact with the temple administration. Only once an amount of wool is said to be delivered to the *é-kišib-ba* "the sealed storage house," which seems to have been under the temple's control (YOS 5 104). Dairy products seem to be delivered directly to their destinations; attested are deliveries for the perfumers' workshop or for offerings (UET 5 627–8).

The temple has thus reached a point where it is not interested any longer in the products of the herds themselves, but mainly in their silver equivalents, and only in restricted amounts of the products for its daily use. The conversion of the products into silver was taken care of by private entrepreneurs who were contracted for that purpose. We do not have any evidence for the activities with sheep and goat products by these men, but some evidence shows how temple cattle were administered in the middle of Rīm-Sîn's reign. In the archive of Apil-kittim from No. 2 Church Lane, dating to the years Rīm-Sîn 31–36 (1792–1787), we see how a private businessman and his associates took care of all the daily worries with regard to the temple cattle. The temple is only mentioned as the owner, but the products are managed by Apil-kittim. The temple gave the right to manage the herds and to convert their products into silver to private businessmen, who were allowed to keep any profits they made during these transactions.

This situation probably changed slightly in the last decades of Rīm-Sîn's reign. From other evidence it seems that the center of the economic resources of the very south of Babylonia was transferred from Ur to Larsa sometime during that period. The palace took a more active role in the economic affairs, but maintained the administrative systems used by the temple. Private businessmen were given the rights to manage the palace properties for a share of the profits. When Hammurabi conquered the kingdom of Larsa he maintained this system which at this time sees the active involvement of the organization of the merchants. The sources from Larsa indicate that the merchants were given the responsibility to market wool, among other products, derived from the herds in the palace's possession. The system was described by Stol (1982), and it shows how the central institution left the daily worries of the administration of its possessions to private citizens, who were allowed to use the resources for their own profit. The herds of the palace were one of these possessions that were now administered by private citizens.

A question that remains to be asked involves the type of animal husbandry practised around Ur. Were the animals kept on agricultural farms, or were they guided by semi-nomadic herdsmen from their summer to winter pastures? We do not know. It seems unlikely to me that these enormous herds could be kept in farmsteads. I would assume that the herds were kept in the steppe during the winter, and near the rivers and irrigation canals in the summer. Such is still the arrangement in Iraq today: "All sheep-breeding depends on seasonal migration. In winter and spring shepherds follow the growth of vegetation in the steppes and deserts, and retire to the rivers and canals as the summer heat dries it up, pasturing flocks upon empty lands close to the water-courses and marshes or upon cultivated fallows, after making an agreement with the cultivators whereby the fellahin receive a rent in animals or their produce in addition to the manuring of their fields." (Naval Intelligence Division 1944: p. 467) In a heavily cultivated area this requires coordination from a central institution, however. The Ur texts do not make any clear mention of efforts by the temple or the palace to do so. The only documents that may have some relevance to this problem are extremely enigmatic. Two texts from No. 1 Broad Street mention areas assigned to men known as cattle or sheep herdsmen. In one text (UET 5 107) the areas are referred to as *Iš*, which can be interpreted as a meadow that remains above the water when the floods come (Heimpel 1987: p. 36). However, in the other text (UET 5 118) fields (*a-šà*) are mentioned which seems to suggest that these are areas assigned to herdsmen as sustenance fields.

The latter interpretation is supported by another text from No. 1 Broad Street (UET 5 850) where a total of 70.92 hectares of fields are assigned for the sustenance of a number of men under Agûa, who is well-known as a supervisor of herdsmen. Hence, it remains unclear whether the temple administration assigned meadows for grazing.

6 Products

a. Dairy products

Only goats and cows were milked in ancient Mesopotamia (Stol, this volume). As goats were rather rare, it seems that most of the dairy products were made from cow's milk. But the texts at our disposal do not make a distinction between the products of the different animals, and it is possible that milk was mixed by the herdsmen. The practice of mixing sheep and goat's milk is attested (Barth 1961: p. 7), and I wonder whether or not cow's milk can be mixed with that of goats.

The main dairy products mentioned in the Ur texts are *ì-nun* "ghee" and *ga-àra* "cheese".¹⁴ It is clearly beneficial to turn milk into these products for preservation in the hot climate of Iraq. Also attested in the texts is *ga*, a term usually translated as milk. In some offering texts it may refer to fresh milk (UET 5 749, 766, 779, 783). In other accounts the term may be used as an abbreviation of *ga-àra* (UET 5 510, 602). In a few texts recording offerings appears a product called *ga-sig-a*, literally "green/yellow milk" (UET 5 749:16, 23; 766:rev. 9; 779:14; 782: 14, 23; 783:22, 35). Stol (this volume) identifies it as *leben*, the sour milk from which butter and cheese are processed.

There is insufficient information to determine the total dairy production. As an example we can cite UET 5 604 dating to the last month of Rīm-Sîn 12. Eight herdsmen, of whom only two are known to have worked with sheep and goats rather than with cattle, deliver a total of 18,710 liters ghee, and more than 16,220 liters cheese. The ghee was delivered in vats of about 30 to 36 liters, which indicates that this delivery took place at one time, and that this is not a summary account for one month or the like. Smaller vats are attested as well, ranging in size from 14 2/3 liters to 32 liters (UET 5 633¹⁵). In contradistinction to the ghee, the cheese is not transported in vats, but *en masse*. It is, however, accounted for in liquid measures rather than by weight. It is probable that the herdsmen were supposed to deliver set quotas of dairy products. In case of arrears they had to compensate for these with silver or with products from their own herds. In case of excess production the situation was not as simple for the herdsmen as with animals which could be easily used to increase the private herd. Dairy products in excess were probably useless to the herdsmen as they could not market them. One text lists these excesses (UET 5 626), and I think it suggests that the entrepreneurs who managed the herds for the temple took the excess, and rewarded the herdsmen for it. How the latter was done is not clear.

b. Meat

As pointed out above, the figures of herd compositions suggest that very few animals were slaughtered for meat consumption. Meat consumption is attested, however, in offerings (Loding 1989: p. 369) and for special festivities of citizens (UET 5 636¹⁶).

c. Wool

The flourishing textile industry around Ur attested in the late third millennium, has only left minimal traces in the Old Babylonian records from the site. There is, however, no reason to think that the industry would have been abandoned, and records of trade with Dilmun indicate that Ur

textiles were exported (UET 5 367). Wool is of course the basic material for that industry. Only a few texts mention the delivery of the product, but they do indicate that large amounts were involved. We have one record each from the second and the fifth days of the last month of 1835 (YOS 5 54 and 56). They list deliveries of 1,498 and 1,860 kilograms of wool respectively. The actual ratio per sheep expected by the temple is stated as being .83 kilogram (YOS 5 104), and the total production of wool by the herds of the Nanna-Ningal temple complex must have been enormous. The shepherds were obliged to deliver a set quantity of wool to the temple, and when they failed to reach the quota they had to compensate the temple with silver (UET 5 637). Excess production was probably kept by them.

d. Skins, horns and tendons

I have been unable to find any reference to these products in the Old Babylonian texts from Ur. This does not indicate, however, that they were not valued and collected. We can explain their absence in the records quite easily. The hides and other parts of dead animals were collected year round by specialized personnel, the SU.SI.G. These did not enter the city wall but their products were processed to a certain extent so that they would not be too ill-smelling to handle. The hides were, for instance, partly tanned before they were brought into town. Once there, they were used in all sorts of crafts, which are unfortunately not documented in the material available at the moment.

e. Dung

Butz (1979:pp. 305–9) has suggested that one of the most important products of the herds around Ur was their dung which was used as manure in the agricultural areas around Larsa. This would explain, in his opinion, the high yields recorded for barley in the texts. This idea is not supported by the evidence on agriculture in our possession. Dung was indeed collected and sometimes shipped from one area to another. But its use as manure is as far as I know never attested. Fields in southern Iraq can only be fertilized successfully if the manure is dug into the soil. Otherwise, the manure dries out very fast, and is blown away. The working of the manure into the fields would have been a very time consuming activity, that should be documented, for instance, in the accounts of fieldwork for Ur III Umma, or in the Sumerian Farmer's Almanac. As far as I know neither source mentions this work. The collection of dung must have taken place for other purposes. It can be easily imagined that dung-cakes were the main source of fuel in the region in antiquity as they are today. Large amounts of fuel were needed for heating, cooking, for certain crafts, etc. Some amount of dung was deposited on the fields when the animals were allowed to graze the young shoots of plants, but I cannot see any evidence that fields were fertilized in any other way.

7 Conclusions

The information on the husbandry of small animals in the region of Ur is thus quite extensive, but at the same time incomplete. The preserved records are almost entirely devoted to the administration of the herds from the point of view of the owners, the Nanna-Ningal temple complex. Although it is impossible to estimate how many animals were owned by that institution, all indications are that the numbers were enormous. The herds were a very important economic asset to the temple complex, and their care involved a large number of citizens. Although animal husbandry may have been one of the main agricultural activities around Ur, it must be regarded as just one of many enterprises. Cereals, dates and vegetables were grown, and fishing was likely

to have been a major enterprise. All these activities must have been carefully coordinated by the temple administration to avoid any conflicts. This probably required a great deal of planning, especially the separation of the herds from the fields with cereals, and a strong central supervision must have been needed.

NOTES TO TEXT

- 1 The Warad-Sîn dates used here are based on a twelve year reign (cf. Sigrist 1985), not on a thirteen year reign (cf. Stol 1976: pp. 1–31).
- 2 Kraus 1966: pp. 52–2 considers winter lambing to be most likely in Babylonia, while Payne in Postgate 1975: p. 19 suggests that it took place in the period from October to December.
- 3 There is one very unclear passage that might contain both *aš-ur₄* and *gub*: in YOS 5 3.i.11–12 we can read 5 u₈ 3 kir₁₁-X 2 kir₁₁-gub. It is a mystery what the second group of animals is supposed to be. In comparison to the other entries in the text one would expect a reading *aš-ur₄* for X, but Grice has clearly copied another sign (copy confirmed by B.R. Foster and G. Beckman), which looks actually more like *gub*.
- 4 Cf. line 62 where they are contrasted to animals entered for plucking.
- 5 A comparison with YOS 5 51–2 shows that they were intended for food.
- 6 Postgate 1975: p. 16 table 2.
- 7 Loding 1989: p. 369 U2548.
- 8 *ša a-ru-a(-ta)*: YOS 5 1.i.16, ii.19, iv.23, v.30; 2.i.17, iii.8, 37, 45, iv.17, 33, v.19; 3.i.14, 35, iv.17; 4.i.36, ii.45, v.10, 31, vii.21, ix.33; 16.i.24; 19:11', 27'; UET 5 809:12, 58; 807:11.
nam-en-na: YOS 5 1.i.12; 2.ii.21, 34, iv.30, v.17; 3.i.10, 32, iv.14; 4.i.32, ii.39, v.7, 26; 16.i.22; 19:25'; UET 5 809:11, 57; 807:8, 21.
- 9 Nomadic Iranian herdsmen of this century only assign up to 300–400 animals to one shepherd unassisted by dogs (Barth 1961: p. 6). Note that Adams 1981: p. 142 considers a figure of only 100 sheep and goats to be adequately guarded by one herdsman.
- 10 Against Butz 1973–74: pp. 48–9.
- 11 Frayne 1990: pp. 139–40 no. 2.
- 12 Frayne 1990: pp. 214–5 no. 10.
- 13 Frayne 1990: pp. 170–1 no. 10.
- 14 See Butz 1973–74: pp. 37–8 for these translations.
- 15 *i-nun-ta* is not a type of ghee, as suggested by Butz 1973–74: p. 39 and n. 89, but the *-ta* merely indicates that the vessels are each of the indicated size.
- 16 Note that only once it is explicitly stated that the sheep was slaughtered (line 37). The other sheep mentioned may have been donated alive, and may not have been eaten.

APPENDICES¹

1) Animal accounts from illicit digs.

YOS 5 17	V/17/Sid 5	1845	Account of loss of sheep and goats.
YOS 5 59	XII/-/Ser 2	1841	Tablet basket tag of shepherds' accounts.
Sigrist 1985	XII/-/Siq 4	1837	Summary shepherds' account for 1845 - 1837. Authority of the Nanna temple.
YOS 5 3	III/30/Siq 5	1836	Account of dead sheep and goats. Authority of the <i>šatammū</i> .
YOS 5 1	VII/11/Siq 5	1836	Account of dead sheep and goats. Authority of the <i>šatammū</i> .
YOS 5 36	XII/20+/Siq 5	1836	Account of dead goats.
YOS 5 2	XII/-/Siq 5	1836	Account of dead sheep and goats. Authority of the Nanna temple.
YOS 5 18	XII/-/Siq 5	1836	Account of dead sheep and goats. Authority of the Nanna temple.
YOS 5 60	-/-/Siq 5	1836	Tablet basket tag of shepherds' accounts.
YOS 5 9	XII/-/ŠA 1	1835	Sheep and goat count. Authority of the <i>šatammū</i> .
YOS 5 10	XII/-/ŠA 1	1835	Sheep and goat count. Authority of the <i>šatammū</i> .
YOS 5 11	XII/-/ŠA 1	1835	Sheep and goat count. Authority of the <i>šatammū</i> .
YOS 5 54	XII/-/ŠA 1	1835	Account of wool deliveries and issues. Authority of the Nanna temple.
YOS 5 55	XII/-/ŠA 1	1835	Tablet basket tag of shepherds' accounts.
YOS 5 56	XII/-/ŠA 1	1835	Account of wool deliveries. Authority of the Nanna temple.
YOS 5 57	XII/-/ŠA 1	1835	Tablet basket tag of shepherds' accounts.
YOS 5 15	VIII/-/WS 1	1834	Account of arrears. Authority of the <i>šatammū</i> .
YOS 5 16	III/-/WS 2	1833	Account of dead sheep. Authority of the <i>šatammū</i> .
YOS 5 32	IV/-/WS 2	1833	Receipt of a-ru-a of cattle.
YOS 5 14	V/16/WS 2	1833	Receipt of a-ru-a of calf.
YOS 5 46	V/-/WS 2	1833	Issue of sheep for the sa.gaz.
YOS 5 50	V/-/WS 2	1833	Issue of sheep for the sa.gaz.
YOS 5 49	VII/-/WS 2	1833	Receipt of a-ru-a of sheep and goats.
YOS 5 51	VII/-/WS 2	1833	Issue of sheep for the sa.gaz.
YOS 5 52	VII/-/WS 2	1833	Issue of sheep for the sa.gaz.
YOS 5 53	VII/-/WS 2	1833	Issue of sheep for the sa.gaz.
YOS 5 30	XII/13/WS 2	1833	Sheep and goat count. Authority of the <i>šatammū</i> .
YOS 5 4	XII/-/WS 2	1833	Account of dead sheep and goats. Authority of the Nanna temple.
YOS 5 31	XII/-/WS 2	1833	Receipt of a-ru-a of sheep.
YOS 5 13	IV/14/WS 3	1832	Account of arrears. Authority of the <i>šatammū</i> .
YOS 5 21	IX/-/WS 3	1832	Receipt of a-ru-a of cattle.
YOS 5 61	XII/14/WS 3	1832	Tablet basket tag of shepherds' accounts.
YOS 5 63	XII/-/WS 3	1832	Tablet basket tag of shepherds' accounts.

YOS 5 82	XIII/[]/WS 3	1832	Receipt of a-ru-a of [cattle].
YOS 5 5	I/-/WS 4	1831	Account of dead sheep. Authority of the <i>šatammū</i> .
YOS 5 25	I/-/WS 4	1831	Account of dead sheep. Authority of the <i>šatammū</i> .
YOS 5 44	II/1/WS 4	1831	Receipt of a-ru-a of sheep, goats, and cattle.
YOS 5 48	III/29/WS 4	1831	Receipt of a-ru-a of sheep.
YOS 5 27	IV/21/WS 4	1831	Receipt of a-ru-a of cattle.
YOS 5 26	IV/-/WS 4	1831	Receipt of a-ru-a of cattle.
YOS 5 22	VI/-/WS 4	1831	Receipt of a-ru-a of cattle.
YOS 5 39	VI/-/WS 4	1831	Receipt of a-ru-a of cattle and sheep.
YOS 5 20	VIII/-/WS 4	1831	Receipt of sheep, goats, and cattle.
YOS 5 24	VIII/-/WS 4	1831	Receipt of a-ru-a of cattle.
YOS 5 42	VIII/-/WS 4	1831	Receipt of a-ru-a of people, sheep, and goats.
YOS 5 43	IX/-/WS 4	1831	Receipt of a-ru-a of sheep.
YOS 5 47	X/13/WS 4	1831	Issue of sheep to sa.gaz.
Owen 1982	X/13/WS 4	1831	Issue of sheep to sa.gaz.
YOS 5 33	XI/21/WS 4	1831	Issue of sheep to sa.gaz.
YOS 5 104	XII/4/WS 4	1831	Account of wool deliveries.
YOS 5 7	XIII/22/WS 4	1831	Account of plucked sheep.
YOS 5 34	I/6/WS 7	1828	Receipt of a-ru-a of sheep and goats.
YOS 5 66	I/-/WS 7	1828	Receipt of a-ru-a of cattle.
YOS 5 29	III/18/WS 7	1828	Receipt of a-ru-a of sheep.
YOS 5 23	IV/-/WS 9	1826	Receipt of a-ru-a of cattle.
YOS 5 37	VI/-/WS 9	1826	Receipt of a-ru-a of sheep.
YOS 5 35	XII/-/WS 9	1826	Receipt of a-ru-a of sheep.
YOS 5 86	XI/-/WS 9	1826	Receipt of a-ru-a of cattle.
YOS 5 64	XII/-/WS 9	1826	Receipt of a-ru-a of sheep and goats.
YOS 5 45	I/23/WS 10	1825	Receipt of a-ru-a of sheep.
YOS 5 6	[]		Account of dead sheep and goats.
YOS 5 19	[]		Count of sheep and goats. Authority of the <i>šatammū</i> .

2) Animal texts from No. 1 Broad Street²

5 807 U17212K	XII/-/Siq 5	1836	Account of sheep and goats under various shepherds.
5 850 U17214G	II/-/WS 5	1830	Sustenance fields issued to Agûa. Total of 70.92 ha.
5 611 U17212D	VI/-/WS 5	1830	Delivery of various sheep.
5 808 U17214D	IV/17/WS 6	1829	Account of cattle.
5 806 no number	IV/16/WS 9	1826	Account of cattle under Agûa.
5 625 no number	I/-/WS 10	1825	List of jars with PN's of herdsmen. Part of this archive?
5 107 U17211G	VI/-/WS 10	1825	Division of meadows between Agûa and Adad-rabi.
5 626 U17212i	VII/16/WS 12	1823	Account of dairy products under ú-túl Agûa.
5 811 no number	II/-/RS 2	1821	Account of cattle under Agûa.
5 810 no number	I/-/RS 3	1820	Account of cattle under various herdsmen.
5 849 U17212H	XI/-/RS 3	1820	Account of cattle.
5 627 U17900G	IV/-/RS 4	1819	Delivery of dairy products by Agûa.
no provenance			

5 534 no number	X/-/RS 4	1819	List of silver and PN's under Ibni-Ea. Part of this archive?
5 812 U17211A	XI/-/RS 4	1819	Account of young animals under Agûa and Adad-rabi.
5 813 U17211L	XII/-/RS 4	1819	Account of arrears of sheep and goats.
5 814 U17212G	XIII/20/RS 4	1819	Account of sheep and goats under Ibni-Ea.
5 111 U17211B	XII/-/RS 10	1813	Account of sheep under Agûa.
5 817 U17211H	XII/-/RS 10	1813	Account of sheep and wool under Šumi-aḫum.
5 818 U17212A	II/1/RS 11	1812	Account of arrears of sheep.
5 604 U17213A	XIII/-/RS 12	1811	Account of dairy products under Agûa and Adad-rabi.
5 118 U17215I	-/-/		Division of fields between Agûa and Adad-ēreš.
5 606 no number	-/-/		Dairy products delivered by various herdsmen.
5 641 U17214B	-/-/		List of numbers + PN's of herdsmen.
5 725 U17214S	-/-/		Account of herdsmen?
5 841 U17214P	-/-/		Issues of sheep and goats.
5 842 U17214T	-/-/		Account of cattle.
5 843 U17214V	-/-/		Account of cattle under Šilli-Adad and Elālī.
5 844 no number	-/-/		Account of sheep under Ibni-Ea.
5 845 no number	-/-/		Account of oxen under various herdsmen.
Related are two texts said to have been found in the Mausoleum site:			
5 809 U17246E	XIII/11/RS 2	1821	Account of sheep and goats under Adad-rabi and Agûa.
5 628 U17246P	X/-/RS 5	1818	Delivery of cheese by Agûa and Adad-rabi.

3) Ganunmah archive: Food products³

UM U2596	VII/-/LEb		Oil, very fragmentary.
Loding 1976 4 U2712	X/-/LEb		Oil rations for Ḫala-Ningal, en of Inanna. Seal of Puzur-ilišu.
Loding 1976 3 U2589	XII/-/LEb		Receipt of ghee, cheese, and dates by Nūr-ilišu.
Loding 1976 8 U2681	VII/-/Gu 7	1926	Oil issues from the Ganunmah.
5 743 U318	IX/-/Gu 7	1926	Oil rations for Šāt-ilija, nin-dingir of Adad, from the Ganunmah. Received by Iddin-Dagan-waqar, the <i>ababdûm</i> .
BM U324	[]/30/Gu 10?	1923	Fragment: honey, ghee, cheese.
UM U2697	IV/-/Gu 13	1920	Oil issues for ill weaving women from the é-kišib-ba . Seal of Ku-Nanna.
5 594 U8811b	VI/-/Gu 13	1920	Oil issues for ill weaver from the é-kišib-ba . Seal of Ku-Nanna.
UM U2703	III/-/Gu 14	1919	Oil issue for weaving woman from the é-kišib-ba . Seal of Ku-Nanna.
UM U2629	III/-/Gu 14?	1919	[] from the é-kišib-ba . Seal of Ku-Nanna, overseer of the weavers.
Loding 1976 5 U2686	IV/-/Gu 14	1919	Oil ration for Šāt-ilija, nin-dingir of Adad, from the Ganunmah. Received by Iddin-Dagan-waqar.

Loding 1976 9 U2690	VI/-/Gu 14	1919	Oil issues for ill millers and bur-sag -people from the é-kišib-ba . Seal of Inim-Nanna.
UM U2622	XI/-/Gu 14	1919	Ghee, oil, and dates received by Ku-Nanna.
UM U2593	II/30/Gu 15	1918	6 column tablet. Dairy products delivered by herdsmen to the Ganunmah.
5 616 U723	III/-/Gu []		Issues of ghee.
5 617 no number	VI/-/AS 10	1896	Ghee issue for ill miller of Ningal from the é-kišib-ba . Seal of Ku-Lugalbanda.
5 623 U737	II/-/Se 15	1880	Deliveries of dairy products.
5 624 U8811a	XII/-/Se 16	1879	Issue of ghee to ill miller from the Ganunmah.
Loding 1976 6 U2583	XII/-/		Oil ration for Ḫala-Ningal en of Inanna, from Lugalezen. Seal of Iddin-Dagan-waqar <i>ababdûm</i> .
3 1079 U2700[]			Issue of oil, cheese, and dates.

¹ AS = Abī-sarē, Gu = Gungunum, LE = Lipit-Eštar, Se = Sumuel, Ser = Šin-erībam, Sid = Šin-iddinam, Siq = Šin-iqīšam, ŠA = Šilli-Adad, RS = Rīm-Šin, WS = Warad-Šin.

The columns contain the following information: I = publication reference, II = date on tablet, III = year B.C. (according to the middle chronology), IV = contents of text.

² Cf. Charpin 1986: pp. 466–7. 5 = UET 5. The second column lists the excavation number (U) of the tablets as they are recorded in Woolley 1976: pp. 214–54. All texts are said to be from No. 1 Broad Street, except those without an excavation number (no number) and a few which are not in Woolley's catalogue (no provenance). Two texts were mistakenly assigned to the Mausoleum site.

³ 5 = UET 5, 3 = UET 3, BM = unpublished in the British Museum, London (courtesy M. Sigrist), UM = unpublished in the University Museum, Philadelphia.

TABLES

Table 1: Herd compositions based on plucking and shearing accounts¹a = u₈ b = kir₁₁-aš-ur₄ c = udu-nita d = sila₄-aš-ur₄ e = uzud f = máš-galg = mⁿⁱás-gàr-gub h = máš-gub

text	a	b	c	d	e	f	g	h	total sheep	total goats
UET 5, 807	150	85?	200	65?					500	
	374	176	674	130		7				
XII/-/1836	30	24	40	16	11	6		3	1464	27
	50	33	130	27		2			240	2
	250	115	650	105		4			1120	4
	75	27	65	20	4	3			187	7
YOS 5, 9	346	138	334	118		[5]			936	5
	338	135	421	108	2	2			1002	4
XII/-/1835	178	86	318	80	3	5			662	8
	74	58	96	40	7	8	5	5	248	25
YOS 5, 10	290?	84?	340	95		11			809	11
	70	20	61	9					160	
XII/-/1835	320?	187	308?	130		6			945	6
	349	113	402	116	2	3			979	5
YOS 5, 11	200	90	345	61	2	2			696	4
	92	25	142	15	1	2			274	3
XII/-/1835	233	90	253	47	6	5	2	2	623	15
	131	64	164	22	[8]	5	2	2	381	17
YOS 5, 30	350	162	586	124	4	4			1222	8
	45	24	30	18		1			117	1
XII/-/1833	122	55	140	44	2	3			361	5
	130	80	220	63	2	4			[493]	6
	[]	18	[]	[]					208	
	66	36	[93]	10					205	
	306	160	466	75		5			1007	5
UET 5, 809	67	20	110	[21]		2			218	2
	70	23	84	20		2			197	2
XIII/-/1821	236	104	282	83		4			705	4
	140	61	147	52		2			400	2
	123	50	170	45	5	5			388	10
	88	20	148	14						
	50	20	40	14					394	
	61	29	80	20	10	10			190	20
	34	13	36	10	10	4			93	14!
	77	30	121	23		2			252	2
	28	26	80	15		2			149	2
	51	20	58	14		2			143	2
	56	20	80	16		2			172	2
	59	12	80	8		1			159	1
	58	30	78	22		3			188	3
	174	131	387	96		5			788 ²	5
	30	21	51	19		2			121	2
	101	40	100	31		4			272	4
	47	30	107	20	4	6			204	10
	47	20	48	11		2			126	2
	64	35	77	30		1			206	1
	41	16	87	15		1			159	1
	165	80	319	70		3			634	3
	123	44	132	40		2			339	2
	50	20	94	15		2			179	2

	92	40	139	37		2		308	2
	106	39	124	30					
	58	18	61	12		2		448	2
	89	55	193	55		[]		392! ³	
UET 5, 814	447	188	618	132				1385	
	30	12	52	12				106	
XIII/-/1819	110	48	160	43	5	8		361	13
	40	16	49	15				120	
	124	42	122	[30]		5		318	5
	134	50	[170]	46		5		400	5
	32	14	58?	13		1		117	1
	313	112	335	111		5		871	5
	90	26	101	25		3		242	[3]
	55	14	100	[15]				184	
	96	32	120?	[40?]	[]	17		288	[?]
	[]	26	120?	[]				252	
UET 5, 111 ⁵	149	29 ⁴	140					318	
	219	40		54				313	
XII/-/1813	75	16 ⁶	68					179 ⁷	
	99	52 ⁸	54					217 ⁹	
YOS 5, 19	178	87	[]	[]	2	[1]		624	3
	15	4	14	3	3			36	3
[]	100	58	160	36	4	2		406	6
	200	76	276	50		3		602	3
	49	23	112	13	8	7			
	20	15	10	5	10	8		247	33

¹ Only the numbers listed in the texts are given. For reasons of clarity the names of the shepherds are omitted, as well as line numbers.² The texts adds 26 u₈-bar-sù-a totalled separately.³ The text adds 35 u₈-bar-sù-a and 2 kir₁₁-aš-ur₄-bar-sù-a totalled separately.⁴ This passage lists kir₁₁-aš-ur₄-sila₄-aš-ur₄ together.⁵ This text is unusual in formulation, although it records plucking.⁶ See note 4.⁷ The total includes 20 udu-nita-sùluhu.⁸ See note 4.⁹ The total includes 12 sila₄-buru₁₄.

Table 2: Herd compositions based on an account of dead animals (YOS 5 1, VII/11/1836)

a = u₈ b = kir₁₁-aš-ur₄ c = udu-nita d = sila₄-aš-ur₄ e = uzud f = ^máš-gàr-gub

			g = máš-gal		h = máš-gub		i = sila ₄ -ga		
a	b	c	d	e	f	g	h	i	total of animals
4	5	6	4	1	3	1			24
6	8	7	9						} 81
9	15	10	16	1					
6	3+	8	2+						
3	3	2	2						10
4	5	6	7	1		1			24
1	2	1	2						6
1				1				3	5
2	2	2	3						9
4	5	5	7	1					22
7	9	9	10						35
13	20	20	22						75
5	6	6	7						24
1	1	1	2	1					6
7	8	8	10						33
3	4	4	5						15 ^{sic}
6	7	8	8						29
2	3	4	4			1			14
4	5	4	5						18
4	5	4	6			1			20
2	2	2	3						9
4	5	5	6						20
5	6	[6]	8			[1]			26
2	3	2	4						11
2	2	2	2						8
1	1	1	1						4
1	2	2	3						8
10	12	12	13						47
2	4	2	5	1		1			15
3	5+	5	[]						24
7	8	6+	1+						35
2	3	2	4						11
3	5	4	5						17
3	4	2	4						13
2	4	4	7						17
	7		9?						16
1	2	2	3						8
2	3	4	[3]						12
1	2	2	[3]						8
[]	2	1+	3	[]					9
1	2	2	3						8
7	7	8	8	2	3	3	4		42
3	4	6	6						19
1	1								2
1	1	1	1						4

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SHEEP AND GOATS AT UGARIT: ALPHABETIC TEXTS

G. del Olmo Lete

(Universidade de Barcelona)

The presence of terms related to small cattle, sheep and goats, in the alphabetic texts from Ugarit is linked to their literary character. Accordingly, three groups of reference may be distinguished: literary, cultic and factual. We are going to record in this sketch, first of all, the complete repertoire of such terms within their own context in order to determine the correct semantic value of the animal under inquiry (sex, age and quality). We will try to organise this repertoire according to a systematic sequence within each group of the above mentioned texts. We will also collect in the following paragraphs, in a more cursory way, the available data related to the breeding and exploitation of small cattle at Ugarit mainly from a lexicographical point of view, too.

1. Lexicography and context

I

References to animals of ovi-caprine species in the mythological and epic texts are bound to the use of certain formulae of either 'banquet' or 'sacrifice', where the animal victim has the value of consumed 'meat', or to the use of certain rhetorical figures with symbolic value, namely figurative, and that as such refer to other semantic fields where they have their functional origin. Their semantics is not always clear on its own and sometimes resort to comparative philology is required.

šin

[t]bḥ šb'm šin

[kg]mn aliyn b'l (KTU 1.6 I 22-23).

The context is a massive funerary sacrifice offered by the goddess Anat to the honour and profit of her dead 'brother' Baal. The semantic opposition results from the first word pair featured here: *rumm/alpm*, bovine cattle in its categories of 'wild'/'domestic'. We can understand in this sense that *šin* is defined by opposition to *aylm* with which it forms a word pair in its turn, setting aside their strict biological species, as a generic designation (the only one among the six terms that is morphologically singular, namely collective) of the ovine domestic 'species': 'sheep'. This meaning is confirmed, moreover, by Semitic lexicography in general (cf. EA *šú-ú-nu*, Heb.-Phoen.-Moab. *š'n*, ASArab. *ḏ'n*, Arab. *ḏa'an*, Palm. *'n*, Syr. *'onō*, Akk. *šēnu*, Sum. *udu*; Sasson 1972:440-41). Comparative lexicography presumes that under this designation sheep as well as goats are included. But this is by no means sure, and the specific mention of 'z (cf. the value of Heb. 'z, Syr. *'enō* ; vid. infra) is more indicative of the contrary.

A similar generic semantic opposition, this time within the same category of 'domestic' animals but as different species (*alp/šin*, 'bovine'/'ovine'; cf. Sasson 1972:441; Levine 1963:108 n. 19) appears in the frequent sacrifice/banquet formula:

tḥ alp ap šin

šql trm wmri ilm

imr qmš llim (KTU 1.22 I 12-14 and par.).

il

In this case however other terms, to be understood from the oppositions that define them, complicate matters. In contrast to *tr*, 'bull', bovine stud male animal, *il* designates the corresponding stud male animal of the ovine species: 'ram'. On the other hand, the designation **mru* only suggests a breeding technique (vid. infra 'fattening'; cf. Heb. *mry*, Akk. *marû/mar'u*, *udu ma-ru-ti*), applicable to different species. This is plain from its 'construct' use: 'fatlings of...' (noun, not adjective). The linguistic parallels are well known (cf. Heb. *'yl*, Akk. *ālu*, Sum. *udu.nita₂ gal*).

The literary formula in its turn specifies the correlative feminine term:

*tat**klb arḥ l'glh**klb tat limrh* (KTU 1.6 II 28–29).

We have then in *tat* the female adult and breeding animal of the ovine species (cf. Old Aram. *š't*, *t't*, Arab. *tā'wat*, *ša'* [?], Akk. *šu'u* [?], semantically *immertu*, *lahru*, Sum. *u₈.mi*, Ug. PN *lhr*). For its possible parallelism with *arḥ* vid. also KTU 1.93:8? (both terms appear exclusively in the literary texts): and for the semantic oppositions within the same species (*tut*, *š*, 'z) vid. KTU 1.80:3–4. However, the texts quoted above offer other designations.

*imr**llu*

In the same way it is possible to establish the value of *imr*, immature animal of the ovine species of indeterminate sex: 'lamb', given its clear opposition/parallelism with *'gl dt šnt*, 'calf, yearling calf' (this temporal determination pinpoints the age of the animal in the absence of a fitting lexeme; cf. Sum. *udu.nita₂ mu 1*, Heb. *šh bn šnt*). This meaning suits other occurrences that suppose *imr* to be a portion appetising and easy to lay hold of and devour, and has a clear semantic confirmation in the cognate languages (Pun. *'mr*, Heb. **mr* [?], Syr. *'emmrō*, Arab. *'immar*, in contrast to Akk. *immeru*, Sum. *udu*, seemingly species designation along with Akk. *puḥadu*, Sum. *sila₄*; cf. Dietrich-Loretz 1985:99–101).

The suggested meaning seems to be confirmed by two other literary formulae:

[i]mšhnn kimr larš (KTU 1.3 V 1 and par.).*al tqrb lbn ilm mt**al y'dbk kimr bph**klli bṭbrn qnh ṭhtan* (KTU 1.4 VIII 15–20 and par.).

This second formula makes a parallel out of the apposition *imr/llu* that we saw above: *imr qmš llim*. That allows us to presume that we are confronted by two synonyms, although maybe not total; if we consider Akk., the term would more probably have the meaning of 'kid', the immature animal of the caprine subspecies (cf. Akk. *lalû/lalā'u*; Sasson 1972:425).

The same word pair *imr/llu* turns out to be confirmed by another formula, this time sacrificial in character:

*qh imr bydk**imr dbḥ bm ymn**lla klatnm* (KTU 1.14 II 13–15 and par.).

At all events, its occurrence as *qmš llim* (for this construction cf. *mri ilm*, *'gl dt šnt* in the same formula) points to *imr/llu* as meaning small and easily consumed pieces that require to be offered in great quantities.

A precision of the meaning of *imr* is given by the hapax *phd* that accompanies it in the epic literature (cf. Akk. *puḥadu*, Sum. *sila₄*; Dietrich-Loretz 1985:100).

*phd**'db imr bphd* (KTU 1.17 V 16–17, 22–23).

We have here a specification that tries to emphasise the immature age of the animal, as the distinction between Sum.-Akk. *sila₄.gub* (*lillidum*, 'mature lamb/ram') and *udu/sila₄.nim* (*hurāpu*, 'spring lamb', under one year old) seems to suggest. It could be assumed in this way that *imr* means 'yearling lamb', over one year old, but not yet the mature animal that either *il* or *š* implies.

We find in the same literary corpus another parallel of *imr* that suggests a new semantic determination of the same species, but seemingly it is only a generic qualification, applicable, namely, to any species of animal victim, enhancing its quality as food: 'prepared/chopped meat'.

*mgṭ**ṭbh imr wilhm**mgṭ wiṭrm* (KTU 1.16 VI 17–18).

The context is strictly that of a banquet, but as food for a convalescent sick man it probably implies the meaning 'tender animal/food', as its parallelism with *imr* already suggests (cf. Heb. *mgš* < **ngš*, Phoen. *mgšr*, Akk. *gūšu/*makaššu*; Sasson 1972:425–26).

In this connection one would feel tempted to give *mgṭ* the value 'suckling lamb, lambkin', non-grazing animal (cf. Akk. *puḥād šizbim*, Sum. *sila₄.ga*), but any linguistic justification to that effect is missing. On the contrary, the technical description of such an animal, without reference to species, though most probably it was ovine, is provided by another epic literary formula:

*mrḡṭ (ṭd)**'d lhm šty ilm**wpq mrḡṭm ṭd**bḥrb mlḥt qš mri* (KTU 1.4 VI 55–58 and par.).

The meaning of the root in Arabic (*rḡṭ*) does not allow any doubt on rating an animal of this kind as food. Nevertheless, it is dubious to suggest any phonetic correspondence between *mrḡṭ* and *mgṭ*.

Finally the lexicography related to ovine cattle is completed by a hapax word pair of sexual opposition in the same mythological context:

*kr**ḥprt**špq ilm krm yn**špq ilht ḥprt yn*

The present word pair seems to point to mature animals of the ovine species ('ram'/'ewe'), judging from the following which refers to the bovine one (*alp/arh*). The linguistic documentation is clear in the case of the male animal (cf. Akk. *ke/arru*, Heb. *kr*; Sasson 1972:423; Delcor 1978:110–11). In the case of the female, however, Akkadian semantics, the only area where this term is also attested, points to a yearling or spring lamb (given the metathesis Akk. *hurāpu/hurāptu*, Sum. *silā₄.nim*, Arab. *harūfat*). But it seems to me that here context prevails: we have here titles/emblems of different gods that require the 'maturity' seme, as is clear in the above quoted word pair of the bovine species.

This arouses in its turn the problem of the categorial distinction between *il* and *kr*, entangled with the occurrence of the words in the cultic texts that also refer to mature animals, male and female (*š*, *dqt*) of the ovine species. We would suggest, as a provisional hypothesis, the following categorisation: *il*, 'breeding/leading ram'; *š*, 'ram'; *kr*, 'fatling ram'; *imr*, 'lamb, over one year old'; *phd*, 'spring lamb, under one year old'; *llu*, 'suckling lamb'. Some of them were undoubtedly castrated although the texts say nothing on the subject.

These literary texts offer little lexicographical information on the caprine subspecies, scarcely three terms, of which two uncertain readings; on the other hand, no mention is made of the he-goat or buck (cf. Heb. *'twd*, Arab. *'atūd*, Akk. *daššu*, *urīšu*, Akk. of Mari *ḫatudu* [cf. García Recio 1990], Sum. *māš.gal/nita₂*). Therefore we will not dwell on this question. We dispense, of course, with the mention of other cervide species that may be related to the ovi-caprine. On the other hand, the meaning of Ug. *štp* (cf. Gordon 1965: n. 2406) and *irn/inr* (cf. Watson 1988:10) is very hypothetical in this connection.

y'l

[tḫ] š]b'm y'lm
[kmgn al]iyn b'l (KTU 1.6 I 26).

The term is semantically established, in the enumerative context already discussed, by the opposition 'wild'/'domestic' that also connotes the preceding word pairs (*rum/alp*, *šin/ayl*) and consequently the meaning 'mountain goat' seems proved (cf. Heb. *y'l*, Syr. *ya'lo*, ASArab. *w'l*, Arab. *wa'l*, *wa'il*, Ethiop. *we'lā*; corresponding to Akk. *turaḫu*, Sum. *dara₃*; Sasson 1972:420–21). Therefore it would be preferable from the point of view of zoological taxonomy to assume the reading *y]hmr* as the b-word of the pair ('mountain goat'/'antelope'; cf. Heb. *yḥmwr*) rather than *hmr* ('donkey'). However, this is an aspect that cannot be stressed, since we are dealing with a literary text and a 'science' that possibly had no clear ideas on animal taxonomy. Therefore preference should be given to the first quoted opposition, 'wild'/'domestic', thus favouring the reading *hmr*, as in the first word pair, with a formal *inclusio* between the first and the last word pair of the numerical scale.

The first of the texts quoted here has caused great discussion because it coincides with others found in the Hebrew Bible, but its reading and interpretation are not sure:

gd

g'd bḫlb annh bḫmat (KTU 1.23:14.)

gdm klhn (KTU 1.111:7).

Aside from the reading, the interpretation is not sure either. While the word pair *hḫlb/hmat* is clear and useful in our case, and we shall come back to it later on (cf. infra III), the word pair

gd/annh (cf. Arab. *nuḥḥat*, Hitt. *ananuḥ-*) becomes ambiguous and may be understood either as 'kid'/'young animal' or as 'coriander'/'mint'. If the first equivalence is accepted, *gd* would have a fairly clear etymology (cf. Heb. *gdy*, Arab. *ḡady*, Pun. *gd'*, Old Aram. *gdh*, Syr. *gadyō*, Akk. *gadû*; Sasson 1972:402–403) and cover the same semantic field as *imr* in connection with the caprine species. But such an interpretation is less probable in our text, just as it has been abandoned in KTU 1.3 II 2 (*rḫ gdm wanḫbm*), where it is not possible any more to speak of 'kids' and 'hares'. The problem of content is further complicated by morphology: the term appears in the cultic and administrative texts written *gdy*, except for KTU 1.111:7 where the dual has perhaps favoured a contracted form. It would be more reasonable to expect standard morphology/orthography in the literary texts. We have then to distinguish: *gd*, 'coriander', *gd*, 'sinew', 'tendon', *gdy*, 'kid' (cf. Sasson 1972:403; De Moor 1987: 121 n. 20).

z'mr

yt'n kz'mrm (KTU 1.6 VI 16).

We would expect a meaning connoting the 'wild' nature of the animal, as in the case of *y'l*, in this other ambiguous text, were the reading certain; but even so, its etymology would turn out to be very doubtful (cf. Heb. *zmr*, Pers.-Aram. *zmr* < *zmr* (?), 'ibex'; according to the Greek version *kamelo-párdalis*, 'giraffe'; and according to the TO *dys*, 'gazelle', SV *ya'lo*, TN *rym'nin*). This last equivalence proves to be very significant from the point of view of the Ugaritic text where *rumm*, 'wild bulls', appears in the second verse of our numerical sequence, whereas the equivalent of Heb. *zmr* in most of the Aramaic versions (the Greek goes its own way) points to a kind of cervide whose male mature individual could be a prototype of aggression, as the text requires. That would lead to a correlation with the mysterious Sum.-Akk. *u₈ za-mu-ra-tum* and *udu ḫa-la-at zu-mu-ra-tim*, that turns up in the Mari letters (ARM xxxiv 45 4; 51, 1–2; cf. García Recio 1990, to whom I owe this information; cf. also Zadok 1992:45). Summing up all these data, the meaning 'ibex' or a kind of mountain goat could be proposed for *zmr*, as ancient Aramaic suggests, but this hypothesis remains to be confirmed.

II

We find anew in the *cultic texts* the generic designation *šin*, attested in many places where the number of victims presented is simply recorded. Only its correlation with others in the same context allows its semantic value to be defined.

šin

š

tat

tmn llm šin (//*alpm*; KTU 1.105:17).
[š]b' šin ḫmnh (//š; KTU 1.106:12–13).
tš' šin walp (KTU 1.106:29).
(*dkr'*) š *alp wtlṭ šin šlmm* (KTU 1.43:6–7).
šin aḫdh... wḫlṭ š[in] (KTU 1.49:5, 8).
lpdr tt š[in] (KTU 1.50:5).
tatt šin (KTU 1.145:1).
tut tḫ ṣtqn (KTU 1.80:3).

The already well known generic value of both terms becomes clear by reason of the semantic opposition *šin/alp*, without reference to age or sex (cf. Ug. *alp dkr*, *alp pr*, KTU 1.86:1–2). These are indicated by two new words, (*dkr*) *š* and *iat*, of recognised Semitic etymology (cf. Phoen. *š*, Heb. *šh* [on possible Ug. *šh*, cf. Gordon 1965: n. 2393], Akk. *šu/šū'u*, Arab. *šat/šāhar*; Old Aram. *t't*, *š't*, Arab. *tā'awat*; possibly there is either allophonic variation or interference between the roots **šwh/tw*; Sasson 1972:446, 450–51), connoting mature animals (on the hypothetical evidence for *rhl*, 'breeding ewe' in KTU 1.111:17–20 cf. Del Olmo Lete 1990:28, n.47; but cf. supra Ug. PN *lhr*).

The second of the terms just mentioned, *iat*, is a dislegomenon. The first, *š*, on the contrary appears very often in the cultic literature, so that it can be stated that it is the main victim (above *alp*, *dqt*, *gdlt*) in the Ugaritic sacrificial system, while its complete absence, on the other hand, from the literary and administrative texts causes astonishment (cf. infra in connection with the texts KTU 1.79–80 and 1.86, belonging possibly to an intermediate category that could be defined as 'cultic-administrative'). Are we in the presence of a technical cultic term? Or does the massive cultic slaughtering of 'rams' represent an outlet for the excess of male individuals in the flocks?

<i>š lb'lb' l š</i>	(KTU 1.119:2; 1.112:5, 28; 1.109:7; 11.39:19; 1.106:6, 11; 1.130:12, 15; 1.115:4, 9, 12; 1.90:19; 1.49:2–3; 1.50:4; 1.27:12; 1.321:5; 1.111:7, 10; RIH 77/2B:7; 77/10B:11, 13; 78/11:7).
<i>alp wšš walp l</i>	(KTU 1.105:2, 9, 21; 1.109:9, 14, 17–18, 20, 27; 1.46:14; 1.41:11, 14; 1.87:12, 15; 1.39:5; 1.43: 6, 16; 1.148:1–4; 1.130:6–8, 14, 25; 1.139:4, 15; 1.134:1; 1.13:3; 6.14:3; 1.132:5; RIH 77/2B: 5; 77/10B:4; 78/4:3–4; 78/11:3).
<i>tn šm l</i>	(KTU 1.105:8, 19, 26; 1.112:3, 19, 23–24; 1.109: 25; 1.46:2; 1.41:5; 1.87:5; 1.132:13, 23).
<i>npš wš l</i>	(KTU 1.105:11).
<i>kbd wš l</i>	(KTU 1.109:8; 1.46:13; 1.39:2).
<i>mtntm wš l</i>	(KTU 1.109:7; 1.46:13).
<i>ršp š / š ršp</i>	(KTU 1.105:14; 1.112:22; 1.109:13–22, 24; 1.46:3,6, 17; 1.41:6, 15–16; 1.87:6, 16–17; 1.39:6–7, 11; 1.106:13–15; 1.148:5–9, 10, 23–24, 38–40, 42–45; 1.130:21; 1.90:20; 1.139:5, 7; 1.53:5; 1.154:6; 1.160:2; RIH 77/10B:15; 78/4:5; 78/11:2).
<i>š itqab (NL)</i>	(KTU 1.105:22–23).
<i>pamt tlpm š</i>	(KTU 1.109:30; 1.41:43–44; 1.87:46–48).
*****	(KTU 1.87:56; 1.106:13–15; 1.115:6; 1.90:6; 1.104:12; 1.126:19; 1.40:17, 25; 1.111:19, 21).

Although only the 'specific' opposition *š/alp* is gained from these contexts (confirming their original meaning), the more precise value 'male individual of the ovine species' is assured for *š* by reason of its common opposition to *dqt* in the cultic texts, just as *gdlt* opposes *alp* as the determinative of the 'female individual' of the same species, sometimes within the same text. The opposition 'small'/'large' connotes in cultic texts only species and sex, not the individual's age. In any case, the offering of *dqt* is less frequent.

dqt

<i>dqtm w gdlt/ynt l</i>	(KTU 1.119:7; 1.105:13?; 1.112:27; 1.109:6; 1.46:12; 1.41:9; 1.87:11; 1.106:20, 31; 1.130:18–19).
<i>dqt l</i>	(KTU 1.109:10; 1.46:15; 1.41:34, 42; 1.87:36–37, 45–46).
<i>spn dqt/dqt spn</i>	(KTU 1.46:4, 7; 1.41:13, 28, 31–32; 1.87:14–15, 30, 33–35; 1.39:1, 3–4, 15–17, 18; 1.132:8–12).

In contrast with the mythological texts, in these texts there are very few terms purporting to define the age of an animal.

imr

<i>imr wynt qrt lt'</i>	(KTU 1.119:10).
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l

<i>lkt' tn 'lm</i>	(// <i>tn šm</i> ; KTU 1.105:25).
<i>'lm gdlt lb' l</i>	(KTU 1.109:32).

In the case of *l*, the context of the first of the quoted texts implies seemingly reference to a young ovine head of cattle by opposition to the mature *š*; in the second, it remains clear that such a young head may also belong to the bovine species (while the literary texts apply it to humans [and gods]: *l umt*). Its probable meaning is simply 'young animal, suckling', connoting only its age (cf. Heb. *'wl*, Pun. *'l*, Ethiop. *'ewāl*, Syr. *'ālō*, Arab. *'ayyil*, with possible allophonic variation of root **'yl/gwl*; for its possible relationship to Ug.Akk. *ú-lu* cf. Sanmartín 1993:202–3). Other determinations like *nbšt yrh*, 'young animal of a month' (KTU 1.130:17; but cf. De Tarragon 1989:217 n. 219) and even *bn hptt*, 'untethered young animal' (?) (// *gl*; KTU 1.15 II 6; cf. Deir 'Allā *hps*; Hackett 1980:50) could be of the same kind. The value of *mr(-m)*, 'puppy, cub, young animal' (?) is uncertain, as well (cf. KTU 1.12 I 11; 1.46:5; Akk. *māru/mūru*; cf. Xella 1981:58 (colt[?]); De Tarragon 1989:165 n. 81; a connection could be established with Sum.-Akk. of Mari *udu mu.ru*, 'lamb' (?); cf. García Recio 1990).

The scant reference to the caprine subspecies in the Ugaritic cultic texts causes surprise (cf. what has been said above on the meaning of *šin* in this regard). Its classic specific designation *'z* appears only in three non-literary texts (KTU 1.80:4; 1.86:14; 1.127:25, 30; vid. infra) and in rather unclear context. Some authors assume the occurrence of *trh(t)*, 'mountain goat' in KTU 1.111:20 (cf. Del Olmo Lete 1990: n. 46).

On the other hand, we have in KTU 1.111:20 the only mention of the term that defines the young animal of the species, *gdy*, 'kid' (cf. infra), quoted above. We have already pointed out that the literary category of KTU 1.79 and 1.80, either as cultic or administrative texts, is uncertain.

III

The lexicographical repertoire related to our subject is rather meagre in the *administrative texts* compared with the abundant references found in the syllabic texts. Some of these texts are simple enumerative records and register the number of heads of small cattle owned by a family:

šin

wbnh atth walp wīmn šin (KTU 4.295:2).

*swn qrt y w[atth]h [w]bnh
wtn alpm [w] iltm šin* (KTU 4.295:12–15).

*anndr ykn'my watth wbnh
walp 'šr šin* (KTU 4.295:15–17).

*aglm ypry[]
wšb' šinh* (KTU 4.417:17–18).

*ilhny yd[] yd tlt
kl[th] wtīm šin* (KTU 4.80:18–20).

We have in other texts the simple record of delivery/sale of products to/by the royal storehouse:

tn alpm [] 'šr šin (KTU 4.275:19–20).

[] tlt kbd šin (KTU 4.127:9).

btlt ilmlk 'šr šin (KTU 4.616:1–2).

..... (KTU 4.616:3ss).

Other administrative texts of book-keeping provide new data on the price of ovine cattle, absolute as well as relative, namely in comparison to other animal species and other items:

tš' šin btš't ksp (KTU 4.33&:22).

'šr šin bitt wkmsk (KTU 4.341:9).

tt ddm lšin mrat (KTU 4.128:2).

wtlm ksp 'šrm šin (KTU 4.709:10–11).

We have within this kind of text a rare mention of the other designation so often attested in the cultic passages:

š

ybnil [] kd yn wš

spr dt [] wš

[] wš (KTU 4.160:2, 4, 11).

The occurrence, on the other hand, of designations that define the age and sex of the animal are scarce in the administrative texts, among which KTU 1.86, difficult to classify (*spr hlmm*), should be included; several terms, already known from the literary texts, are mentioned in it and the two subspecies, ovine and caprine, appear together for the first and only time as a unit:

imr

llu

wšin 'z [] llu [] imr.... (KTU 1.86:14–17).

It concurs in this sense (record of subspecies and types) with KTU 1.80, similarly difficult to categorise and interpret:

š

ta/ut

b'gt ilštm' bt ubnyn

šh dytn šqn

tut t'bh šqn

bbz 'zm t'bh š

bkl ygz t'bh' šh (KTU 1.80:1–5).

Such a text must probably be related to KTU 1.79 (cf. *šqn ilštm'*) which mentions a new animal, this time of the caprine subspecies, 'z (cf. *'nz, Heb. 'z, Pun. 'z, Syr. 'ezzō/'enzō, Old Aram. 'nz, Akk. *enzu/ezzu*, Amor. *hazzu*, Sum. *uz*, *maš*) that completes the generic designation of the species already attested in the two previous texts:

'z

gdy

gdy lqh šqn gt bn ndk (KTU 1.79:4).

The young animal of the caprine subspecies, of which we spoke above, appears here in plene writing together with another administrative text that even gives its price:

'šrm gdy' bhmš šmn whmš t'dt (KTU 4.150:3–5).

2. Breeding: the flock and the small cattle market

The Ugaritic consonantal texts do not provide detailed information on the breeding, herding and keeping of ovine cattle. Simple references to the personnel in charge are given, as well as to the number of such animal that a family could own and the market price they could fetch. The mere mention of a 'yard', *trbš* (KTU 1.14 II 3; Akk. *tarbašu*, NHeb. *trbš*) says nothing on the stabling of such cattle at Ugarit.

I

The occupation of shepherd is recognised and recorded as fundamental in an economy strongly based on husbandry. Reference to shepherds is sometimes accompanied by mention of fee and office.

r'y

spr r'ym lqh š'rt (KTU 4.378:1–2).

r'ym dt bd iytlm (KTU 4.374:1).

lr'ym šb'm lmitm dd (KTU 4.243:45).

dd[m] lr'y (KTU 4.175:7 [PN?]).

r'ym 2 (KTU 4.125:4).

[šb]'m kbd lr'[ym] (KTU 4.243:47).

[r]iš r'y y[šlm] (KTU 2.2:1).

'Shepherds' of other animal species are also mentioned (*uzm*, KTU 4.129:1; *hmrm*, 4.618:3), given its general meaning of 'feeder, grazer' (cf. Heb. *r'h*, Syr. *r'ō*, Arab. *ra'ā*, Ethiop. *re'eya*, Akk. *re'ū*, Sum. *lú sipa*; in Akk. the term may refer to the 'ox shepherd'; cf. Sanmartín 1993:206). Therefore it cannot be assumed that this office, without any other determinative, is restricted to the ovi-caprine species. Like many other offices, the shepherd could also have his

own 'assistant boy' (KTU 4.129 numbers 11 of them with their respective bosses; but we cannot ascertain whether they were 'shepherds').

s/šgr

<i>r'ym...hryn wšgrh</i>	(KTU 4.374:1-2).
.....	(KTU 4.374:3-7).
<i>sdrn wtn šgrh</i>	(KTU 4.374:8).
.....	(KTU 4.374:9-15).

In this case, however, we are sure that they were 'shepherd boys' under a 'head shepherd', *riš r'y*. The etymology of *s/šgr* is uncertain (Aistleitner WUS n. 1940, following Virolleaud, assumes it to be an allophonic variant of *šgr* (?); its Akk. cognate is in Mari *kizū*, Ug. *kzy*, Sum. *iš/kuš*, Akk. *kaparru*).

The *nqd* belongs to another hierarchy, even if we accept his connection with cattle (cf. Heb. *nwqd*, Syr. *noqdō*, Akk. *nāqidu*, Sum. *lú na.gada*; so linguistically, but the semantic correspondence is perhaps better rendered by Akk. *utullu*, Sum. *ú-du-lu*; cf. Waetzoldt 1982 394ss.). On the one hand, the *nqdm*, gathered in groups, seem to be subordinate to a master; on the other, they are recorded along with the great dignitaries and the religious and military chiefs of the Ugaritic Court, but in lists where other workers are recorded, as well, and like them are assigned fees. However, their chief (*rb nqdm*) was in the time of Niqmaddu the Head Priest (*rb khnm*) of the kingdom. His was then a public function of the high administration, related probably to palace and temple economy as provider of heads of cattle to the royal table and to the sacrificial altar. The *nqdm* would then be the head 'shepherds' of the royal flocks mainly as an administrative office (cf. Dietrich - Loretz 1975:336-37; Segert 1987:409-11).

nqd

<i>rb khnm rb nqdm t'y nqmd</i>	(KTU 1.6 VI 55-57).
<i>nqdm... bn altn 4[</i>	(KTU 4.681:1-2).
<i>tnnm nqdm khnm</i>	(KTU 4.68:70-72; 126:4-6; 4.416:4-6).
<i>[u]bdy nqdm [tlt] šdm...</i>	(KTU 4.103:44-45).
<i>'bdyrh nqd tqlm</i>	(KTU 4.98:12).
<i>tnnym arb't kbd ksp dnqdm</i>	(KTU 369:6-8).

If the restoration *[n]q¹dm* is correct we would have in KTU 4.624:1 shepherds equipped with bow, quiver, sling and spears, weapons necessary for them in their function as 'guardians' of the flocks against any possible thief and assailant, a function that would distinguish them from the simple *r'y*. But such weapons might also be a sign of high office, with no real practical use.

Two texts mention 'shearers', *gzzm* (cf. Heb. *gzz*, Syr. *gaz*, Arab. *gazza*, Akk. *gazāzu*, *gizzu*; Delcor 1978:114ss) with the wages due to them specified. We do not know anything else about this seasonal activity. On the other hand, it is rather improbable that this root occurs in KTU 1.80:5 (*ygz*).

gzz

<i>iltn dd kšmn lgzzm</i>	(KTU 4.269:4).
<i>tt ddm lgzzm</i>	(KTU 4.269:26).
<i>'šrm yn mšb []lgzzm</i>	(KTU 4.213:30).

II

The administrative texts also offer some hints of the number of ovine heads a peasant family could own as a part of its patrimony (in some cases as either payment or tax; cf. Heltzer 1976:44). The texts were quoted above and it is clear that an individual could possess small flocks of seven, eight or ten sheep up to middle size ones of some thirty or sixty head. The Ugaritic texts reflect in this way a modest peasant society and give in general a very 'credible' image of the organization and standard level of the agricultural economy of the Ugaritic Kingdom, far from the fanciful affluence that the Eblaite texts show in this connection.

It is possible that other accounting records would keep some higher figures in connection with flocks and cattle transactions passed on account of the royal trade system, but we can only guess as much due to their bad state of preservation.

III

We also quoted above some texts giving details on the price paid for a head of ovine cattle. As Heltzer points out, the moderate price in the cattle market of Ugarit is also plain in this case. The standard value seems to lie between one and one and a half silver shekels per head, cheaper than in other markets round about (cf. Heltzer 1978:21, 86, 100, 112). While a fatted sheep (*mrat šin*; accordingly the term is fem. sing. rather than pl.; cf. Gordon UT n. 2137) was worth two jars (of oil?), a kid was only worth a quarter plus a fraction of a jar, which turns out to be a fitting ratio as far as the weight is concerned.

This fattening technique, on the other hand, is presumed in the mythological texts quoted above (*mri ilm*; cf. Akk. *marû*, Sum. *niga*; Sanmartín 1993:202) and was employed with different animal species, for instance, oxen and geese. Even 'to fatten gods and men' was considered the function of the fertility god (cf. KTU 1.4 VII 50-52).

3. Exploitation: products and by-products

Apart from 'meat', semantically identified with the animal, as much in its everyday consumption as in its sacrificial use, ovi-caprine cattle provide a series of products whose exploitation is attested in the Ugaritic texts.

Offal. It could be possible to refer in the first place to the sacrificial (and of course magical) use of the offal or 'remains' of the animal body (reserved to this sphere?). The pertinent vocabulary has been recently presented and documented elsewhere (cf. Del Olmo Lete 1989; 1992); we shall restrict ourselves here to their simple enumeration, keeping in mind, however, that in most cases the texts do not point out to which animal species such offal belongs: *ap*, *npš*, *ap wnpš*, *lb*, *d/tid* (?), *kbd*, *mtnt*, *ššrt*, *slh*, *rt*, *ğšb*, *knp* (?), *hgb* (?).

The remainder of the terminology for parts of an animal's anatomy does not seem to have economic connotations and goes, therefore, under the heading of 'meat' (for instance, *qš mri*, 'fatling chops'). The texts do not speak either of the everyday consumption or of trade exploitation of the offal mentioned.

Milk and butter. A typical product of the sheep cattle exploitation is milk and its by-products. The textual references are, however, scarce in this connection and we are not sure whether we are

dealing with milk from sheep/goats or from cows; goats would be the ordinary milk-producing animal. Aside from the doubtful text KTU 1.23:14 (KTU 1.15 II 26 does not come into question), which may allude to the well known cultic use of 'cooking a kid in its mother's milk', banned by the Bible, only KTU 4.272 accounts for such a product, while KTU 4.707 gives some data on its price:

hlb

hmat

hmš kkr hlb (// *šmn*; KTU 4.272:2).
alp mitm kbd ilt hlb (// *ilt šmn*; KTU 4.272:5).
kkh hlb btql wkmsk (// *kkh š'rt*; KTU 4.707:19–20).

The price of milk was very low in Ugarit as may be deduced from the last quoted text. This is pointed out by Gordon (cf. UT n. 862), who suggests at the same time that the second text, and even the first, may allude to a kind of metal. On the other hand, it cannot be proved that the term could also mean 'butter, cheese', as suggested by Aistleitner, in view of its measurement by the 'talent' (in Sumer 'butter' and 'cheese' were measured/weighed by the 'litre', which is no less 'strange'). It is very likely, however, that milk was eaten then not as a fresh product, as in modern times, but in the form of 'curdled milk' or 'yoghurt'; and in this form it was weighed by the 'talent'. The value 'milk' of *hlb* is however clear from KTU 1.15 II 26 (*hlb aṭrt*; cf. Heb.-Aram. *hlb*, Syr. *ḥalbō*, Arab. *ḥalab*, *ḥalīb*, Ethiop. *ḥalīb*, Akk. *ḥalābu*, Sum. *ga*). On the other hand, for 'butter' we have another designation as may be inferred from KTU 1.23:14 (*hmat*; cf. Heb. *ḥm'h*, Aram. *ḥm't*, ASArab. *ḥm't*, Akk. *ḥimētu*, Sum. *ī.nun.na*). But we know nothing about it as an item of everyday consumption, apart from this obscure cultic use.

Hair and wool. Another product obtained from sheep and goats is their hair, above all from sheep ('wool'), as raw material for the textile industry. Its production and trade are fully attested at Ugarit and its linguistic designation is clear, *š'rt* (cf. Heb. *š'r*, *š'rh*, Arab. *ša'r*, Akk. *šipātu*, *šārtu*, Ug.Akk. *šāhartu* [Can.], Sum. *síg*; cf. Sanmartín 1993:207; it seems that the term could also indicate a certain type of dress).

š'rt

spr r'ym lqh š'rt (// *ššlmt*; KTU 4.378:1–2).
lqh š'rt... kkr... (KTU 4.131:1ss).
aḥd kbd arb'm bhṣr lqh š'rt (// *hlpnt*; KTU 4.630:1–3).
tt ḥrtm lqh š'rt (KTU 4.630:6–7).
šr ḥrš bḥtm lqh š'rt (KTU 4.630:8–10).
arb' ḥrš qṭn lqh š'rt (KTU 4.630:11–13).
tt nsk ḥzm lqh š'rt (KTU 4.630:14–15).
ṭmn larb'm lqh š'rt (// *ššlmt*; KTU 4.144:5–6).
tš' dt tqh[n] š'rt (// *ššlmt*; KTU 4.395:2–3).
lydln š'rt (// *hpn*; KTU 4.188:8).
..... (// *lqh*; KTU 4.188:5ss).
prtwn š'rt (// *ššlmt*; KTU 4.46:4).
..... (KTU 4.46:5–14).
bn ady kkr š'rt nṭkh (// *šmn*; KTU 4.225:13–14).

hmš pld š'rt (// *ptt*; KTU 4.152:7).
hmš hnpnt š'rt (KTU 4.152:10).
[š]r pld dt š'rt (// *hpnnt ptt*; KTU 4.270:8).
šr pld š'rt (KTU 4.270:12).
ilt pld š'rt (// *ptt*; KTU 4.205:7).
ilt kkr š'rt (KTU 4.341:3).
šr kkr š'rt (KTU 4.341:14).
šb' mat š'rt (// *mlbš*; KTU 4.182:2).
š'rt šb' šrh (KTU 4.182:14).
šb' mat š'rt (KTU 4.182:19).
[m]at š'rt (KTU 4.182:30).
mit abr't kbd h[ms] š'rt (KTU 4.270:4–5).
wmit š'rt (KTU 4.50:9, vid. 4.19:10; 4.49:10; 4.50:9).
ṭlm lmit š'rt (// *hpn*, *mlbš*; KTU 4.168:3).
kkh š'rt mṣrt (KTU 4.721:14).
kkrm š'rt štt bd gg[t]
b'šrt ksp (KTU 4.337:9–10).
kkh š'rt šb't ksp (KTU 4.158:17–18).
kkh š'rt btqlm (KTU 4.707:15–16).
[k]kr š'rt btql (KTU 4.707:17–18).
šb't kkr š'rt bkkr aḥdd (KTU 4.709:1–2).
w bkkr ugri hmš kkrm
alp ṭmn mat kbd dmnḥt (KTU 4.709:3–6).
ṭmnym arb't kbd ksp
š'rt mnḥt (KTU 4.709:7–9).

It may be deduced from this group of texts that 'wool' could be a kind of salary that different sorts of workers could earn, usually a 'talent' in weight, as KTU 1.131 makes clear (others could obtain other products, for instance, *ššlmt*). The payment could of course have the character of a simple personal assignment. Wool could be used as well as a tax on production, as KTU 4.225 suggests. Moreover, it could be delivered as a finished product, namely clothing (*pld*, *hpn*), undoubtedly distinguished according to function as well as raw material (*ptt*). The import trade of this product is also attested (*š'rt mṣrt*).

Other texts, frequently due to their fragmentary state, offer only figures for quantities of wool that have to be thought of as weighed by the 'shekel' when it is not specified as by the 'talent', as in the case of milk. Some of these texts, moreover, give its price which oscillates remarkably between two and seven silver shekels per 'talent', due undoubtedly to production changes and to the quality of the material which is unspecified (cf. Heltzer 1978:23–25, 75–76, 88, 101, 113; Ribichini-Xella 1985:15–17).

On the other hand, we omit here the different dyeing and manufacturing techniques of this product which belong already to the field of the textile industry so typically 'Phoenician' (cf. Heltzer 1978:25–27; Ribichini-Xella 1985:22–23).

Hide and horns. The hide of sheep and goats, like that of any other animal, was also made good use of. But this fact remains concealed in a word (*msg*) having an inadequate phonological

correspondence in the other Semitic languages, although belonging to the Mediterranean linguistic background (cf. Eg. *mšk*, Greek *méskos*, Akk. *mašku*, Heb. *mšk* [and maybe also Heb. *msk*, 'curtain', which covered the Tabernacle], Palm. *mšk*, Aram. *mšk*, Arab. *mask*, Sum. *kuš*). The classic term *gr*, however, is not used in this context. The meaning of the word has, in any case, shifted from the material itself to the object made from it: 'shield (made out of hide)'.

msg

ynhm msg (KTU 4.52:7).
 (KTU 4.52:1-18).
mđrglm dinn msgm lhm (// *qšt, utpt*; KTU 4.53:1-2).
mšht wmsg dtbk (KTU 4.167:15-16).

Another product originated from this animal species and employed as well in the industry of military equipment is the 'horn of mountain goat' (*qrn y'l*), praised by Aqhat as one of the most suitable components for the manufacture of a (double) bow worthy of a goddess (cf. Heb.-Pun. *qrn*, Arab.-Ethiop. *qarn*, Aram. *qrn*, Akk.-Amor. *qarnu*, Sum. *munsu*). Other components, though required for this purpose and also taken from the animal kingdom (*gd*, *mtn*), are ascribed to other species (*rum*, *tr*).

qrn

adr qrnt by'lm (KTU 1.17 VI 22).

* * *

This, then, is the record of data that the consonantal texts from Ugarit provide in connection with animals of the ovi-caprine species, a record that must be integrated within the framework of the syllabic texts with which they form a documentary unity. They are two linguistic witnesses to the same social, economic and cultural reality.

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SHEEP AND GOATS IN THE AKKADIAN ECONOMIC TEXTS FROM UGARIT

J. Sanmartín

(Universitat de Barcelona)

In the economic life of Ugarit small cattle seem to have played a rôle normal for an Eastern Mediterranean rural community, but by no means preponderant. J Huehnergard, *The Akkadian of Ugarit* (HSS 34, Atlanta Ga. 1989 [henceforth: AkUg]), p. 317, lists only eight texts under the general superscription sheep and goats.

Figures are never particularly impressive, neither are the quality and quantity of derived products, with the only exception of purple woollen items. As to be expected, there is no mention of the meat of sheep and goats outside the rituals and related religious texts.

The most interesting facts belong perhaps to the lexicological field. Here Ugaritic goes occasionally its own way, also in the Akkadian written texts. We have to pay attention to some exceptional lexicographical items (almost always introduced by the "Glossenkeil"), rare logographs or unknown readings, and unorthodox use of the expected Northern Syrian syllabary.

Assyriological abbreviations according to AHW. Note furthermore:

AkUg = J. Huehnergard, *The Akkadian of Ugarit* (HSS 34; Atlanta Ga. 1989)

DUG(ms) = G. del Olmo-J. Sanmartín, *Diccionario Ugarítico* (manuscript)

GAGl =D. Sivan, *Grammatical Analysis and Glossary of the Northwest Semitic Vocables in Akkadian Texts of the 15th-13th C.B.C. from Canaan and Syria* (AOAT 214; Kevelaer/Neukirchen-Vluyn 1984)

KTU = M. Dietrich, O. Loretz & J. Sanmartín, *Die keilalphabetischen Texte aus Ugarit* (AOAT 24/1; Kevelaer/Neukirchen-Vluyn 1976)

UT = C.H. Gordon, *Ugaritic Textbook* (AnOr 38; Rome 1965) ['no.' refers to the glossary]

WuS = J. Aistleitner, *Wörterbuch der ugaritischen Sprache* (Berlin 1965)

A. SPECIES AND BREEDS: DEFINITION AND IDENTIFICATION

I) Alphabetical repertory:

<i>a/il</i>	DUG(ms): 'carnero' ('ram')
<i>imr</i>	DUG(ms): 'cordero' ('lamb')
<i>gd(y)</i>	DUG(ms): 'cabrito' ('kid')
<i>dqt</i>	DUG(ms): 'res menor u ovina, oveja, como ofrenda sacrificial' (fem. head of small cattle, for sacrifice')
<i>hpri</i>	DUG(ms): 'cordera, oveja' ('ewe')
<i>y'l</i>	DUG(ms): 'cabra montés' ('wild goat')
<i>kr</i>	DUG(ms): 'cordero' ('male lamb')
<i>llu</i>	DUG(ms): 'cordero, lechal' ('suckling')
<i>mgṭ</i>	DUG(ms): 'res sacrificial' ('head of cattle for sacrifice')
<i>'z</i>	DUG(ms): 'cabra' ('goat')
<i>phd</i>	DUG(ms): 'cordero añojo' ('yearling lamb')
<i>šin</i>	DUG(ms): 'oveja, (col.) ganado lanar' ('sheep, small cattle')

- š DUG(ms): 'carnero, res ovina' ('ram, head of small cattle')
- tat DUG(ms): 'oveja(s)' ('ewe')
- del.: [!annh, UT no. 557: 'kid(?)'; cf. WuS Nr. 1794: 'Minze'; cf. DUG(ms): 'menta(?)']
- [!spr, UT no. 2186 'bird/buck(?)'; cf. WuS Nr. 2346: 'hungrig'; DUG(ms): 'pájaro']

II) Syllabic material:

enzu (^{udu}ÚZ) [alph. 'z]

- (1) PRU 6 117 (RS 17.136): account of various kinds of sheep,
l. 2: 30 ^{udu}ÚZ.X Ú.LU
- (2) PRU 6 119 (RS 19.69): account of she-goats,
l. 1: 15 ÚZ
- (3) PRU 6 120 (RS 19.116): account of various kinds of sheep,
l. 1: 1 *me* 33 ÚZ^{me}

Comments: (1) Reading and significance of the sign following ÚZ are uncertain; cf. J. Huehnergard, AkUg p. 366 (122b). See below: ÚZ.MÁŠ.
For the writing Ú.LU see below Ú.LU.

hurāpu (UDU.NIM.MA)

- (4) AnOr 48 27 (RS 1957.4): account of delivery of spring lambs,
l. 1: 68 ^{udu}NIM.MA

Comments: (4) For the elsewhere unattested .CA-writing ^{udu}NIM.MA (standard writing ^{udu}nim; cf. MSL 8/1 p. 36, 258f. and Note) see J. Huehnergard, AkUg p. 74. Cf. below *marû*.

immeru (UDU.(NÍTA)) [alph. *imr*]

- (5) PRU 3 69 (RS 16.269): royal grant of land,
l. 19: (PN and his sons) [...] Ì^{meš}-šū KAŠ^{meš}-šū [GUD(?)]^{meš}-šū UDU-šū *la-a* [*ušerab a-n*]a É.GAL-*li*
- (6) PRU 3 71 (RS 16.295): adoption of grandson as son,
ln 6: (PN) *it-ta-ši* É-šū A.ŠÀ^{bi-a}-šū GUD^{meš}-šū ANŠE[^{meš}-š]u UDU^{bi-a}-šū *gáb-bá mi-im-mi-šū ù id-di-in-šū a-na* (PN)
- (7) PRU 3 102 (RS 15.109+16.296): grants with payments,
l. 4: É^{bi-a} A.ŠÀ^{bi-a} UDU^{bi-a} GUD^{bi-a} *mar-ši-tu* ša-a (PN)
- (8) PRU 3 141 (RS 16.132): royal appointment, grant and exemptions,
l. 22: (PN) GUD-šū ANŠE-šū UDU-šū ŠE^{meš} KAŠ^{meš} Ì.GIŠ^{meš} NÍG.X(?) ù *gáb-bu mim-mu-šū a-na* É.GAL *ú-ul e-ru-ub-ma*
- (9) PRU 3 147 (RS 16.153): royal grant of a town,
l. 12: ŠE^{meš}-šū KAŠ^{meš}-šū ša : *ma-'a-ša-ri-ša ù* UDU^{meš} : *ma-aq-qa-du a-na* (PN)
- (10) PRU 3 187 (RS 16.357): account of exchange of sheep (?),

- l. 6:] KÚ.BABBAR [ša *i-l*]e(?)*-qì* ([PN] ...) [*i-n*]a(?) *p[u(?)]-ha-ti* UDU^{meš}
- (11) PRU 3 188 (RS 16.290): label: sheep,
l. 1: 94 UDU^{meš} ŠU (PN)
- (12) PRU 3 205 (RS 16.155): account of sheep, oxen,
A l. 1–6: 3 / 20 / 11 / 4 / 86 / 27 UDU^{me1?} UGU (PNN)
A l. 7: 1 *li-im* 8 *me-at* 21 UDU^{me1?} šu-ku-na
- (13) PRU 6 4 (RS 17.142): letter from PN to the prefect of Ugarit,
l. 8: *a-nu-ma a-na* ŠEŠ-*ia* 10 UDU^{bi-a} 6(?) GA.KIN.AG šu-gul-ti *ul-te-bíl*
- (14) PRU 6 115 (RS 17.37): account of sheep,
l. 1: 1 *me-at* 13 UDU^{meš} UGU (PN and PN and his wife and his son)
- (15) PRU 6 120 (RS 19.116): account of various kinds of sheep,
l. 2: 30 UDU.NÍTA^{meš}
- (16) PRU 6 121 (RS 19.141): account of sheep,
l. 1: 2 *me-at* 1-*en* UDU UGU (PN),
l. 2: 38 UDU UGU (PN),
l. 3: [6]0(?) + 3 [UDU^{bi-a}](?)
l. 4: [x]+2 UDU^{bi-a}: KA-ar-ba-DU[
- (17) Ug 5 95 (RS 20.01): census (by household?),
passim, (PN) *qa-du* x ZI^{meš} x GUD^{meš} x UDU^{bi-a}
- Comments:* (9) For the ugaritism: *ma-aq-qa-du* see below: B. 1. II., : *maqqadu*
(15) J. Nougayrol *ad loc.*: *zikarū*^M

immertu [cf. alph. *tar*]

- (18) PRU 6 120 (RS 19.116): account of various kinds of sheep,
l. 4: *im*](?)*-me-er-tu*^{meš}

: KA-ar-ba-DU

- (19) PRU 6 121 (RS 19.141): account of sheep,
l. 4: [x +] 2 UDU^{bi-a} : KA-ar-ba-DU[

Comments: (19) for the reading : KA-ar-ba-DU[see J. Huehnergard, UVST p. 140: 'probably a fem. pl. adjective [...] modifying UDU^{bi-a} [...]. The term presumably refers to a particular characteristic of the sheep, or, more likely, of their wool.' Huehnergard refers to the Sem. root /*k-r-b*/ (Ar., Syr., Eth.; also Hbr. and Harsūsi), and renders 'twisted (?)'. Nougayrol's suggestion in PRU 6 p. 155 ('type de mouton') is rightly rejected by Huehnergard, *ibid*.

kukkallu (^{udu}GUG.GAL)

- (20) PRU 6 117 (RS 17.136): account of various kinds of sheep,
ln 1: 1 šu-ši 8 ^{udu}GUG.GAL^{me}

Comments: (20) Note the pseudo-logogram ^{udu}GUG.GAL^{me} for *kukkallu* 'fat-tailed sheep', instead of the standard writing GUKKAL (UDU+HÚL); see Huehnergard, AkUg p. 77, 406 (537).

lahru (^{udu}U₈) [alph. cf. *lat*]

- (21) PRU 6 117 (RS 17.136): account of various kinds of sheep,
1. 4: 1 *me* 11 ^{udu}U₈^{mes}
- (22) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 1: 1 *me* 10 ^{udu}U₈^{mes}

marû (NIGA^{ga}) [alph. *mru*]

- (23) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 2: 4 *ma-ru-u*(?)
- (24) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 2: 8 MÁŠ^{mes} N[IG]A^{ga,mes}

Comments: (23) *marû*, with sg. after numeral, not unknown in Alalah and elsewhere in Ugarit. Syllabic *marû* is used substantivally to denote a male fatling. For the writing with U (for the more frequent U) see Huehnergard, AkUg p. 397 (411).
(24) For *urîšû* (MÁŠ^{mes}) see below: *urîšû*. Note the adjectival logogram NIGA.GA^{mes} (more likely: NIGA^{ga,mes}), here with the additional .CA sign, not attested elsewhere. See Huehnergard, AkUg p.74.

šenu (U₈.SAL(!).UDU^{hi-a}) [alph. *šin*]

- (25) PRU 3 57 (RS 15.120): will, division of family property(?),
1. 18 É^{hi-a} A.ŠÀ^{hi-a} *ri-hu* [m]ar-ši-tù GUD^{mes} U₈.SAL(!).UDU^{hi-a} [AR]AD^{mes}-tu
GÉME^{mes} [š]a i-ba-ši i-na É (PN). Cf. *ibid.* 13.

Comments: (25) Note the aberrant writing U₈.SAL(!).UDU^{hi-a} for the perhaps intended U₈.UDU^{hi-a} (USDUHA); Huehnergard, AkUg p. 77.

Ú.LU

- (26) PRU 6 117 (RS 17.136): account of various kinds of sheep,
1. 2: 30 ^{udu}ÛZ.X Ú.LU
1. 3: Ú.JLU ŠU (PN)
1. 5: ^{udu}J^{munes} ÁŠ{DAM[!]}.GÀR(:EŠGAR)^{mes} Ú.LU
- (27) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 3: 42 ÛZ.MÁŠ.MEŠ Ú.LU
1. 5: Ú.LU^{me} (Nougayrol:]? immerû(?)^M

Comments: (26) ÛZ.X, see above: *enzu*. For ^{udu}J^{munes} *uniqētu*(ÁŠ{DAM[!]}.GÀR(:EŠGAR)^{mes} see below: *unīqu*

(26/27) The writing Ú.LU was tentatively explained by Huehnergard, UVST p. 159 and AkUg p. 381 (318), as an ugaritism : /'ūlu/ 'young (child or animal)'.
One has to call attention however to the following facts: a) there is in the Ugarit alphabetical texts a lexeme 'l denoting a 'young animal', but it is said only of bovines, its contextual translation being therefore 'calf' (DUG(ms): 'cria, ternero'; KTU 1.109:32; 4.749:1f.); this precludes its appearance in this small cattle context; b) Ú.LU never appears with figures on its own; it rather seems to work syntactically in our texts as an adj. qualifying the foregoing nouns (in unbroken passages these nouns always refer to goats: 30 ^{udu}enzu (ÛZ.X) Ú.LU; 42 ÛZ.MÁŠ.MEŠ Ú.LU; ^{udu}J^{munes} *uniqētu* (ÁŠ{DAM[!]}.GÀR(:EŠGAR)^{mes}) Ú.LU).

(26/27) The writing Ú.LU was tentatively explained by Huehnergard, UVST p. 159 and AkUg p. 381 (318), as an ugaritism : /'ūlu/ 'young (child or animal)'.
One has to call attention however to the following facts: a) there is in the Ugarit alphabetical texts a lexeme 'l denoting a 'young animal', but it is said only of bovines, its contextual translation being therefore 'calf' (DUG(ms): 'cria, ternero'; KTU 1.109:32; 4.749:1f.); this precludes its appearance in this small cattle context; b) Ú.LU never appears with figures on its own; it rather seems to work syntactically in our texts as an adj. qualifying the foregoing nouns (in unbroken passages these nouns always refer to goats: 30 ^{udu}enzu (ÛZ.X) Ú.LU; 42 ÛZ.MÁŠ.MEŠ Ú.LU; ^{udu}J^{munes} *uniqētu* (ÁŠ{DAM[!]}.GÀR(:EŠGAR)^{mes}) Ú.LU).

An explanation for this writing Ú.LU (to my knowledge elsewhere attested only as reading for the grapheme UL: *ul-lu* in MSL 3, p.137, S^b 96f., see further in Ebla ul: *ù-lu-um*, MEE 3, 52 v. V 1f.) could be found in the equation Ea I 189f.: lu.ú: LU: *ú-du-ú*: *du-uš-šu-ul*: *re-é-ú* (MSL 14, p. 186; lu.ú: LU, Proto-Ea 62 *ibid.* p.33). One has to assume in RS a defective or unorthodox tradition of the series Ea=*nâqu*, so that the Ug. writing Ú.LU for the Sumerian value Ú.LU : LU is perhaps nothing else than a peculiar RS inversion of the standard writing lu.ú (see for other instances Huehnergard, AkUg p. 73 (2.)), used in our texts logographically for the Akkadian 'translation' *re'û*. We so would obtain: 'read LU: *ú-du-ú* as *ú!lu!* to signify *re'û* ('careful) tended'.

Maybe the writing Ú.LU is also to be connected with the rather mysterious LÚ.Û.DAB(?) from Ug 5 96 (RS 20.12): 10 (AHw p. 1576: =(?) *mušākilu(m)*); see AHw p. 680 'Fütterer v. Rindern/Schafen'). That would admittedly presuppose a confusion between the homophones Ú/Û, a type of variation also attested in Mesopotamian lexical texts (Huehnergard, AkUg p. 75f.). See below B.4.II: LÚ.Û.DAB(?).

(27) ÛZ.MÁŠ.MEŠ, see below: ÛZ.MÁŠ. In line 5 read: Ú.LU^{me} (Nougayrol:]? immerû(?)^M)

unīqu (^{udu}J^{munes} ÁŠ{DAM[!]}.GÀR(:EŠGAR).MEŠ)

- (28) PRU 6 117 (RS 17.136): account of various kinds of sheep,
1. 5: ^{udu}J^{munes} ÁŠ{DAM[!]}.GÀR(:EŠGAR)^{mes} Ú.LU
- (29) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 3: 44 ^{udu}J^{munes} ÁŠ{DAM[!]}.GÀR(:EŠGAR)^{mes}

Comments: (28) For Ú.LU see above: Ú.LU
(28/29) ^{udu}*uniqētu* is actually rendered in both instances by the abnormal writing UDUDAM[!] (^{munes}+ÁŠ).GÀR (see C. Kühne, UF 5 (1973) 189) for the expected ^{munes}EŠGAR (MUNUS.ÁŠ.GÀR, M. Civil [R. Borger, ABZ⁽²⁾ p. 192 (554)]; Huehnergard, AkUg p. 385 (339).

urîšu (MÁŠ)

- (30) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 2: 8 MÁŠ^{mes} N[IG]A^{ga,mes}
- (31) PRU 6 122 (RS 21.203): account of goat hides,
1. 1: 1 *me* 27 KUŠ MÁŠ^{mes}

Comments: (30) for *urîšu* see MSL 8/1 p.30, 215 and B. Landsberger, *ibid.* p. 55–59: 'male goat [of] intermediate age'. For *marûtu*(NIGA^{ga,mes}) see above: *marû*

ÛZ.MÁŠ [= (?) *enzu* (^{udu}ÛZ)]

- (32) PRU 6 120 (RS 19.116): account of various kinds of sheep,
1. 3: 42 ÛZ.MÁŠ.MEŠ Ú.LU

Comments: (32) The writing ÛZ.MÁŠ.MEŠ is unattested elsewhere. J. Nougayrol renders 'chevreau' (?) in PRU 6 p.155; Huehnergard doesn't offer any explanation for it (see AkUg p.67, 360 (76), 366 (122b)). The text writes only *urîšû* (MÁŠ^{mes}) in the preceding line; ÛZ seems to work in line 3 as a sort of determinative.

B. HERDING STRATEGIES

1. Pasturing and Penning Policies

I) Alphabetical repertory:

trbš(t) DUG(ms): 'reserva, cortijo, corral' ('enclosure, yard').

II) Syllabic material:

: *maqquadu* (MA.KAD)

- (1) PRU 3 147 (RS 16.153): royal grant of a town,
 1. 12: ŠE^{mes}-šū KAŠ^{mes}-šū ša : *ma-'a-ša-ri-ša* ù UDU^{mes} : *ma-aq-qa-du a-na* (PN)
- (2) PRU 6 116 (RS 17.64): account of silver amounts for grazing rights,
 1. 1: DUB-*pu* KÙ.BABBAR ša MA.KAD

Comments: (1) *maqquadu* is an ugaritism; note the introducing 'Glossenkeile'. It is related to the root /n-q-d/, thus denoting something like 'grazing rights'; so J. Nougayrol, PRU 3 p.225 (RS 16.153:13); "droit de pacage", qui portait sur les moutons'. In his footsteps also D. Sivan, GAGI p.244; J. Huehnergard, *UVST* p.154. For the somewhat strange apposition to *immerātu*(UDU^{mes}) see the translation by Huehnergard, *ibid.*: '... and the sheep – the grazing rights(?) – likewise belong to NP'. Needless to say, syllabic *maqquadu* is unrelated to alph. *mqdm* in KTU 4.158:19 (J. Sanmartín, UF 21 (1989) 342s.: 'angebrannte Hölzer').

(2) MA.KAD, pseudo-logogram for Ug. *maqquadu*; Huehnergard, AkUg p.77.

muqqādu

- (3) PRU 6 116 (RS 17.64): account of silver amounts for grazing rights,
 1. 6: KÙ.BABBAR *an-nu-ú ša mu-qa-dī-IM*¹(^{hi-a(?)}) ša *it-te-e[h]*[?]

Comments: (3) AHW p.674: *mūqadu* 'Feuerherd' (?) is most unlikely. For a more convincing explanation as 'grazing rights' (?), see Huehnergard, AkUg p.154: 'grazing rights(?)'; also D. Sivan, GAGI p.249; J. Huehnergard, *UVST* p.154: 'this silver is (that) for grazing-rights(?) that remained (to be paid)'.

2. Values and numbers

I) Sheep:

Figures:

- (4) PRU 3 205b (RS 16.155): account of sheep, oxen,
 A l. 1: 3/20/11/4/86/27 UDU^{me1?} UGU (PNN)
 A l. 7: 1 *li-im* 8 *me-at* 21 UDU^{me1?} šu-ku-na
- (5) PRU 6 4 (RS 17.142): letter from PN to the prefect of Ugarit,
 1. 8: *a-nu-ma a-na ŠEŠ-ia* 10 UDU^{hi-a} 6(?) GA.KIN.AG šu-gul-ti ul-te-bíl
- (6) PRU 6 115 (RS 17.37): account of sheep,
 1. 1: 1 *me-at* 13 UDU^{mes} UGU (PN and PN and his wife and his son)
- (7) PRU 6 121 (RS 19.141): account of sheep,
 1. 1: 2 *me-at* 1-en UDU UGU (PN)
 1. 2: 38 UDU UGU (PN)

1. 3: [6]0(?) + 3 [UDU^{hi-a}](?)
 1. 4: [x]+2 UDU^{hi-a} : KA-*ar-ba*-DU[

- (8) Ug 5 95 (RS 20.01): census (by household?),
 1. 6,8,9: (PN) *qa-du* 6/6(?)3(?) ZI^{mes} 2/3(?)2 GUD^(mes) 5/15(?)24+x UDU^{hi-a}
- (9) AnOr 48 27 (RS 1957.4): account of delivery of spring lambs,
 1. 1: 68 ^{udu}NIM.MA

Exchange:

- (10) PRU 3 187 (RS 16.357): account of exchange of sheep (?),
 1. 6:] KÙ.BABBAR [*ša i-l*e(?)*-qì* ([PN]...) [*i-n*]a(?) *p[u(?)]*-*ha-ti* UDU^{mes}

II) Goats:

- (11) PRU 6 119 (RS 19.69): account of she-goats,
 1. 1: 15 ÛZ
- (12) PRU 6 122 (RS 21.203): account of goat hides,
 1. 1: 1 *me* 27 KUŠ MÁŠ^{mes}

III) Sheep and Goats:

- (13) PRU 6 117 (RS 17.136): account of various kinds of sheep and goats,
 1. 1: 1 šu-šī 8 ^{udu}GUG.GAL^{me}
 1. 2: 30 ^{udu}ÛZ.X Û.LU
 1. 4: 1 *me* 11 ^{udu}[U]₈^{mes}
 1. 5: ^{udu}] ^{minus}ÁŠ{DAM¹}.GÀR(: EŠGAR)^{mes} Û.LU
- (14) PRU 6 120 (RS 19.116): account of various kinds of sheep and goats,
 1. 1: 1 *me* 33 ÛZ^{me}
 1. 1: 1 *me* 10 ^{udu}U₈^{me}
 1. 2: 30 UDU.NÍTA^{mes}
 1. 2: 4 *ma-ru-u*
 1. 2: 8 MÁŠ^{mes} NIGA^{ga.mes}
 1. 3: 42 ÛZ.MÁŠ.MEŠ Û.LU
 1. 3: 44 ^{udu}] ^{minus}ÁŠ{DAM¹}.GÀR(: EŠGAR)^{mes}
 1. 4: *im*](?)*-me-er-tu*^{mes}
 1. 5: Û.LU^{me} (Nougayrol:]? *immeru*(?)^m)

3. Seasonal events: birth and shearing.

Alphabetical repertory:

gzz DUG(ms): 'esquilador' ('shearer')

4. Owners, shepherds and other personnel.

I) Alphabetical repertory:

nqd DUG(ms): 'mayoral' ('head shepherd, foreman')
r'y DUG(ms): 'pastor, ganadero' ('shepherd')

II) Syllabic material:

nāqidu (NA.GADA) [alph. *nqd*]

(15) PRU 6 93 (RS 17.131): list of professions with numbers of people,

l. 7: ¹⁶NA.GADA 3 MIN (l. 1: L[Ú(?)]^{mes})

(16) PRU 6 131 (RS 19.35 A): account of bows by professions/towns,

l. 9: [¹⁶] ^{mes}NA.GADA 1 ^{giš}BAN 1 ^{kuš}É.A[MAR.RU x ^{kuš}ga]-ba-bu

¹⁶Û.DAB(?) [cf. Ú.LU, above: A. II]

(17) Ug 5 96 (RS 20.12): account of servants,

l. 10: ¹⁶Û.DAB(?) (between Û.DAB(?) MUŠEN and Û.DAB(?) GUD)

Comments: (17) Nougayrol translates '(1) berger(?)', Ug 5 p.190, 341. Both AHw p.1576 and Huehnergard, AkUg p.401 (455) and 406 (537) ask about a possible equation ¹⁶Û.DAB = *mušākilu(m)* 'feeder, fattener' (AHw p.680; CAD M/2 p.245; see LÚ ŠE.BAL.AK = *mu-ša-ki-lum* (-rum) in OB Lu D 89, apud CAD M/2 p.245: *mušākilu*). In view of the equation Ea I 190: lu.ú : LU ú-du-ú : re-é-ú (MSL 14, p. 186) cited above (see A. II: Ú.LU) it seems possible to think about a re-writing of Nougayrol's (and Huehnergard's) LÚ.Û.DAB in Ug 5 96 (RS 20.12): 9–11 as ¹⁶Û (for Ú).LU (=re'ú). Such an oscillation between Ú and Û is attested in RS.-Akkadian as well as in Mesopotamian lexical texts (Huehnergard, AkUg p. 75f). For ¹⁶re'ú *alpi*, *iššūrē* see MSL 12, p.239 IV 4f.

[re'ú refers only to oxen in RS.-Akkadian, in the syntagm *re'ú alpi* (¹⁶mesSIPA GUD), PRU 3 11 (RS 15.18):10; cf. UDU^{bi-a} *qa-du* ¹⁶SIPA, Ug 5 84:17]

C. PRODUCTS

1. Milk and milk products

I) Alphabetical repertory

hlb DUG(ms): 'leche; queso, manteca' ('milk; cheese, butter').

II) Syllabic materials

GA(.KIN.AG) [cf. alph. *hlb*]

(1) PRU 6 4 (RS 17.142): letter from PN to the prefect of Ugarit,

l. 8: a-nu-ma a-na ŠEŠ-ia 10 UDU^{bi-a} 6(?) GA.KIN.AG šu-gul-ti ul-te-bíl

(2) PRU 6 156 (RS 19.24): items for sale,

l. 1: 3 GUN GA^{mes}

Comments: (1) Nougayrol, PRU 6 p.6, tentatively translates '6(?) fromages(?) écrasés(?)', in light of Ur III GA.GAZ. This also presupposes the elsewhere unattested reading *šu-gul-ti*, from *šagāšu*; see *ibid.* note 1. For GA.KIN.AG compare [ga.kin].gál.la : *kan-š[u]*, Hh XXIV 102, MSL 11, p.81 (OB Forerunner 343: *ga.kin.gál.la*, MSL 11, p. 157).

(2) Counting in talents admittedly requires the translation of GA^{mes} as 'cheese'. See alph. *kkh hlb*, 4.707:20; *hmsš kkr hlb*, 4.272:2.

2. Hair and wool

I) Alphabetical repertory

š'rt DUG(ms): 'lana, pelo; tejido de lana' ('wool, hair; woollen cloth')

II) Syllabic material

ša'artu [alph. š'rt]

(3) PRU 6 128 (RS 19.104): account of various types of garments,

l. 5: 1 ¹⁶šá-ḥar-tu

Comments: (3) *ša'artu* 'wooll(en garment)' is an ugaritism; see J. Nougayrol, PRU 6 p.159; D. Sivan GAGI p.59; J. Huehnergard, *UVST* p.183. There is an alph. GN š'rt rendered by syll. ¹⁶SÍG; see AnOr 48 26 (RS 1957.3):6; PRU 3 189 (RS 11.790): 1'; Ug 7 pl.13 (RS 34.131): 28.

šipātu (SÍG) [cf. alph. š'rt]

(4) PRU 6 155 (RS 19.155): silver amounts for various items,

l. 2: 2 me 60 GÍN KÙ.BABBAR SÍG^{mes}

(5) PRU 6 162 (RS 19.36): account of various items,

l. 4: 8 me GÍN SÍG^{mes}

(6) PRU 6 165 (RS 19.93): accounts of various items,

l. 4:] SÍG^{mes} []^{mes}

3. Hides and skins, bone, horns and hooves, intestines etc., stomach (rennet), bladder

I) Alphabetical repertory:

msg DUG: 'piel, cuero' ('hide, leather')

II) Syllabic material

mašku (KUŠ) [alph. *msg*]

(7) PRU 6 122 (RS 21.203): account of goat hides,

l. 1: 1 me 27 KUŠ MÁŠ^{mes}

(8) PRU 6 123 (RS 17.328): accounts of various garments and hides,

l. 4: l[i(?)-bíl-ta KUŠ^{mes}

RECORDS OF SHEEP AND GOATS AT MYCENAEAN KNOSSOS AND PYLOS

John Killen

(*Jesus College, Cambridge*)

I. KNOSSOS

In a discussion published in 1964,¹ I suggested that the purpose of the records of sheep, classified as Da-Dg, Dl and Do, at Knossos in late Bronze Age Crete was to record animals belonging to the central power which had been handed out to shepherds in various parts of the island, and whose production, in both wool and lambs, was expected to meet certain requirements. Earlier interpreters of these tablets had taken them to be record of tribute, on the grounds (i) that many of the tablets recorded a round number of animals, most often 100; (ii) that on both the records as a whole and on the great majority of the individual Da-Dg tablets far more male than female animals were recorded; and (iii) that a number of the records contained references to deficits, indicated by the abbreviation *o*.² As I pointed out, however, not only did the 'tribute' hypothesis involve a remarkably large number of animals being supplied to the palace each year as taxes (something of the order of 80–100,000 from the central area of the island,³ as compared with a sheep population for the whole of Crete in 1956 of 529,910),⁴ and the assumption that meat was consumed in Mycenaean Crete on a scale for which there was little to prepare us elsewhere on the tablets⁵: all three of the characteristics of the records which have just been mentioned could neatly be explained if it were assumed that the Da-Dg tablets were flocks of wethers (castrated males), and mixed wethers and ewes, of a type which was kept on a large scale for wool production purposes in medieval England. On medieval English estates, flocks of this kind were regularly handed out to shepherds in round numbers;⁶ and since flocks of this type are of course not capable of self-regeneration, it is common in accounts of this period to find references to flock numbers falling below those originally allocated,⁷ which could, I suggested, be a parallel for the 'deficit' entries on the Knossos tablets.

Moreover, considerable encouragement for the view that the Knossos documents do in fact record real flocks, rather than tribute to the centre, is, I argued, provided by the records in the Dk and Dl classes. Taking first the Dk records, these show wool as well as sheep entries; and one can demonstrate that the standard 4:1 ratio between sheep and wool total on the tablets is the equivalent of a relationship of one sheep to c. 1.6 lbs of wool. Given that this figure is well in line with figures for the average wool production of sheep both in medieval England⁸ and in other societies before the introduction of selective breeding,⁹ it is difficult to doubt that the purpose of these tablets is to record wool production targets for the sheep in question, with the wool 'present' figure on the tablet indicating the amount which had actually been received by the palace at the time of the compilation of the record, and the wool deficit entry found on almost all the records in the series the amount still outstanding. In the case of a few Dk tablets, it is possible to show that they concern the wool production target set for one of the flocks on the Da-Dg tablets;¹⁰ and it is difficult to doubt, therefore, given the great similarity between all the Da-Dg records in terms of their content and layout, which makes it likely that all had a similar purpose, that for each of the records in that group there would originally have been a Dk 'shearing' counterpart.

The fact that the archives contain records of wool production targets, similar to those set on medieval English estate when flocks were distributed to shepherds in the estate's employment for pasturing, is clearly a considerable encouragement for the belief that the Da-Dg tablets not only might, but actually do, record real flocks. And a further piece of encouragement for this belief is provided by the records in the D1 series. Many of these tablets are like the Dk records in containing wool entries; but they differ from them (a) in showing equal numbers of female and male animals; (b) in showing all the male animals as *ki*; and (c) in showing a sheep:wool ratio of 10:1, as against 4:1 on the Dk tablets. All these facts can, I argued, be neatly explained on the assumption that these are records of breeding flocks, kept to supply replacements for the predominantly wether flocks on the Da-Dg tablets. The recording of ewes first on these tablets, and in relatively large numbers, is clearly well in accordance with that explanation; and if we assume that the *ki* male sheep entries relate to lambs (with the male sheep ideogram (OVIS^m) here being used to denote both male and female animals, as it can be shown to do on the Dk shearing tablets), the standard ewe: *ki* OVIS^m ratio of 1:1 can neatly be explained in the same terms as the standard sheep:wool ratio on the Dk tablets, viz. as reflecting a production target, in this case one of one young animal for every ewe held set for breeding flocks. And strong encouragement for the belief that *ki* OVIS^m does in fact denote a young animal is provided by the sheep:wool ratio of 10:1 on these records. If *ki* sheep were expected to provide little or no wool, as obviously might be the case with lambs, the sheep:wool ratio changes to c. 5:1; and a shearing target for ewes slightly smaller than that set for wethers, or mixed wethers and ewes, is entirely in accord with what we know of the wool producing capacity of female as compared with male sheep.¹¹

Examples of each of the various types of record that we have been discussing are set out below, together with a typical member of the Do series of tablets, which have a number of their characteristics in common with the D1 records, and are evidently, like them, records of breeding flocks, but which show a ewe: *ki* sheep target of eighty lambs per one hundred ewes (a target familiar in similar records in the ancient Near East).¹²

Da-Dg 'flock' record

Df 1121 + 7689

- .A da-mi-ni-jo , OVIS^m 143 OVIS^f 36
 .B ti-mi-za / ku-ta-to pe OVIS^m 21

The tablet concerns a group of 200 animals (143 male, 36 female and 21 *pe* (perhaps "last year's") at the place *ku-ta-to*. The name at the beginning (*ti-mi-za*) is that of the 'shepherd'; the name *da-mi-ni-jo* above the place-name is that of a so-called 'owner' or 'collector': a seemingly important figure (perhaps a member of the royal family, a major palace functionary or the like) who may be mentioned on the tablet as having some beneficial interest in the flock.¹³

Dk 'shearing' record

Dk (2) 1076 + 8052

- .A x OVIS^m 200 LANA 33
 .B ti-mi-za / da-mi-ni-jo o LANA 17

This is evidently the 'shearing' record for the same flock as is listed above. It notes that the 200 animals attributed to *ti-mi-za* (note the use of the male form of the ideogram to denote both male and female sheep) have been set the standard target of one wool unit (c. 3 kg.) for each four animals held. Of the target of 50 wool units, 33 have already been supplied at the time of the compilation of the record, and a further 17 remain outstanding.

D1 'breeding' record

D1 (1) 947 + 7626

- .A e-se-re-e-jo OVIS^f 80 *ki* OVIS^m 10 LANA 11 [
 .B si-da-jo / ma-ri o *ki* OVIS^m 70 o LANA 5]

On my explanation of this record, the 80 ewes in the breeding flock of *si-da-jo* at *ma-ri* have been set the standard D1 breeding target of one lamb per ewe held. Of these lambs, ten have been supplied at the time of the compilation of the record, while a further seventy remain outstanding. Of the wool target set for this flock (effectively, one wool unit for every five ewes held, working out at 16 wool units for the flock as a whole), 11 units have so far been supplied, while a further 5 remain outstanding.

Do 'breeding' record

Do 927

- .A] pe OVIS^m 19
 .B]se OVIS^f 100 *ki* za OVIS^m 30 o OVIS^m 31

Note the ewe:*ki* sheep ratio here of 100:80, rather than 100:100 as on the D1 tablets. The sign *se* before OVIS^f probably abbreviates the place-name *se-to-i-ja*.¹⁴ Note the distinction drawn in the *ki* OVIS^m entry between *pe* and *za* animals: probably "last year's" (*pe-ru-si-nu-wo*, */perusinwoi/*) and "this year's" (*za-we-te-ro*, */tsāwesteroi/*).¹⁵

Though this explanation of the Da-Dg records has been generally accepted, and while I still believe that it is correct in its broad outline, subsequent research on the Linear B records has undeniably brought one element of it into question. This is the suggestion that the *o* entries on the records reflect losses from the flocks due to natural causes. This, however, can hardly be correct. The reason is two-fold. First, we can now be much more certain than we could be in 1964 that the term *o-pe-ro* on the records, and its abbreviation *o*, is not used in the neutral sense of 'absent', but always refers to a deficit in a payment to the palace, whether of taxes or of manufactured goods that are due to the centre following an earlier allocation of the necessary raw materials.¹⁶ And, second, whereas losses from flocks from natural causes might be expected to run at an average level of c. 15% per annum,¹⁷ the figures in the *o* entries on the sheep tablets show a quite different pattern. On the great majority of the records, no *o* entry at all occurs; and where *o* entries do occur, the figures in them are often (a) multiples of ten and (b) either well below or comfortably in excess of 15% of the total number of animals in the flock.

How are these facts to be explained? It is not easy to arrive at a certain answer; but it is clearly difficult to doubt, given analogies elsewhere in the records, that *o* here refers to a deficit for which the palace holds the shepherd named at the beginning of the tablet responsible. Do, therefore, these entries relate to shortfalls in the flocks, presumably noted at an annual census, which have occurred, not through natural losses, but to the shepherd, for one reason or another, failing to produce at that particular time all the sheep which he had been allocated; and does the absence of deficits from the great majority of the records reflect the fact *either* that the figures for animals 'present' include figures for dead sheep, whose skins, however, the shepherd has been able to supply to the palace, thus proving that the loss is a genuine one,¹⁸ *or* (and perhaps more likely, since we might have expected dead animals to have been identified as such) that no losses are recorded because the 'shepherd' was in fact a relatively substantial owner of sheep, who had his own animals in addition to those he pastured on behalf of the palace, and who was expected

to make good from his own, private flocks any losses in the palace's herd?¹⁹ If this explanation is correct, the breeding flocks on the DI, Do records (which are in fact not very numerous) may have had the rôle of supplying replacements, not in all cases of loss, but only in circumstances where, for one reason or another, a shepherd was unable to make good a shortfall even with the help of his own resources.

II. PYLOS

The Linear B records from Pylos in Messenia on the Greek mainland include, on the tablets classified as Cn, lists of some 12,000 male and female sheep (OVIS^m, OVIS^f) and male and female goats (CAP^m, CAP^f). What is the purpose of these documents?

There are a number of points in common between these records and the tablets in the D series at Knossos which we have discussed in the first section of this paper. The numbers in the individual 'flocks' of sheep are of the same order of magnitude as those at Knossos, and sometimes involve round hundreds; there are similar proportions of male and female sheep in the records as a whole; some of the entries on the Cn records involve an individual other than the shepherd who is reminiscent of the 'collectors' or 'owners' on the D records; and there are regular references at Pylos to sheep described as *pa-ra-jo*, *lpalaiol*, 'old', just as there are frequent mentions at Knossos of animals qualified as *pa*, which it is tempting to suspect may be an abbreviation of *pa-ra-jo*. It is true that there are also some differences between the two series: at Knossos, for instance, *pa* animals are relatively infrequent, and do not constitute entire flocks, like the *pa-ra-jo* animals at Pylos; and – a particularly striking difference – all the flocks at Pylos contain animals of a single sex only: there are no parallels on these tablets for the mixed flocks of males (as we have argued, wethers) and females found on a significant number of the Da-Dg records.²⁰ Despite these differences, however, the similarities between the records at both sites are sufficiently close to make one suspect that whatever the broad explanation of the records is at one site is also likely to be their explanation at the other.

But what is the explanation of the Cn records? In her paper 'Cn flocks' in the *Proceedings of the Cambridge Colloquium on Mycenaean Studies* (1966),²¹ Mabel Lang suggested that they are concerned with recording *tribute*. Pointing out that a number of the men's names found on Cn 131 recur on Cn 655 and Cn 719, usually in connexion with the same place and nearly always with animals of the same type and sex, she suggests that the former is a record of an assessment for tribute and the latter a note of the actual payments. The full list of correspondences between 131 and 655 + 719 is set out beneath.

Tablet	Shepherd	OVIS ^m nos.	Tablet	OVIS ^m nos.
131.2	<i>o-ku-ka</i>	OVIS ^m 130[719.5	OVIS ^m 70
131.3	<i>ku-pi-ri-jo</i>	OVIS ^m 50	719.7	OVIS ^m 60
131.4	<i>ko-ru-no</i>	OVIS ^m 100	719.9	OVIS ^m 66
131.3	<i>a-ka-ma-wo</i>	OVIS ^m 120	719.11	OVIS ^m 96
131.6	<i>to-ro-wi</i>	OVIS ^m 130	655.2	OVIS ^m 133[
131.7	<i>ke-ro-wo</i>	OVIS ^m 130	655.3	OVIS ^m 85
131.7	<i>ra-pa-sa-ko</i>	OVIS ^m 91	655.4	OVIS ^m 69
131.14	<i>pu-wi-no</i>	CAP ^f 55	655.5	OVIS ^m 190
131.10	<i>e-ti-ra-wo</i>	OVIS ^m 100	655.9	OVIS ^m 70
131.10	<i>a-ta-ma-ne-u</i>	OVIS ^m 140	655.10	OVIS ^m 60

131.8	<i>a-ri-wo</i>	OVIS ^m 100	655.12	OVIS ^m 14
131.11	<i>se-no</i>	OVIS ^f 44	655.19	OVIS ^f 40

At first sight, Lang's suggestion appears to have a number of attractions. Most of the sheep numbers on 131 are larger than those on 655 + 719, and they involve more multiples of ten: which would obviously fit well with the hypothesis that 131 lists an assessment and 655 + 719 the actual payments. There are, however, some serious difficulties for her hypothesis.

First, two of the OVIS^m figures on 655 + 719 are larger than those in the corresponding entry on 131; and it is difficult to believe that any of the shepherds would have contributed more animals than the authorities actually required him to. (See 131.3 *ku-pi-ri-jo* OVIS^m 50 vs. 719.7 *ku-pi-ri-jo* OVIS^m 60; 131.6 *to-ro-wi* OVIS^m 130 vs. 655.2 *to-ro-wi* OVIS^m 133[.) Second, a serious problem arises over the entries on Cn 131 and Cn 655 which relate to *pu-wi-no*. On Cn 131, *pu-wi-no* is listed in connexion with 55 she-goats, while on Cn 655 a person of the same name is mentioned in connexion with 190 male sheep. Clearly, if this is the same person in both contexts, Lang's hypothesis will become untenable. Lang herself suggests that *pu-wi-no* is a different person in each context; but while this possibility cannot finally be excluded, there must be some serious doubt as to whether she is correct. As we have seen, there are a large number of other correspondences between the names on Cn 131 and those on Cn 655 + 719; and it would be a remarkable coincidence if in this instance, and this alone, a name that was shared in common by the two lists referred to two different persons. [As in the case of most of the other persons named on both 131 and 655 + 719, *pu-wi-no* is stated as being at the same location (here *ma-ro-pi*) in both instances.] Third, whereas twelve of the twenty-five men on Cn 131 (Lang's 'assessment' record) reappear on 655 + 719 (her 'payments' record), thirteen do not. Lang suggests that the thirteen individuals in question were shepherds who had been contributors in the last collection of tribute, and who were hence being mentioned again in the current assessment on their district, though they were not in fact destined to make a contribution in the current year; and she suggests that this remarkably large turn-over of contributors might be explained in terms of 'the parlous military situation in Pylos at this time'. Again, however, while we cannot finally exclude this possibility, the suggestion does not strike one as particularly plausible, given the absence of any convincing evidence for the impact of a 'parlous military situation' on other records at Pylos which we can be certain relate to taxation.

Another explanation of the correspondences between 131 and 655 + 719 has been suggested by L.R. Palmer.²² In his view, Cn 131 is the first member of a set of records to which 655 + 719 (and Cn 643) also belong; and the repetition of the shepherds' names on 131 and 655 + 719 is simply a reflection of the fact that the individuals in question (who he takes to be contributors of livestock for butchery) have contributed (or will contribute) two different flocks for this purpose.

Here again, however, it is not easy to accept the explanation. It is perfectly true that we do have instances elsewhere in the Cn records of 'two-flock' shepherds/herders; the following table sets out the evidence for the phenomenon:

Tablet	Shepherd	Details of Flock/Herd	Tablet	Details of Flock/Herd
Cn 40.1	<i>ne-ti-ja-no</i>	* OVIS ^m 140	Cn 599.1	CAP ^m 100
Cn 40.8	<i>ro-ko</i>	* OVIS ^m 150	Cn 655.13	? OVIS ^m 180
Cn 719.4	<i>ma-ra-ni-jo</i>	* OVIS ^m 230	Cn 643.3	CAP ^m 48
Cn 719.8	<i>ku-ka-ra-so</i>	OVIS ^f 130	Cn 643.4	CAP ^f 53

Cn 719.10	<i>pa-pa-ro</i>	OVIS ^m 100	Cn 643.1	? OVIS ^m 40
Cn 285.5	<i>a-we-ke-se-u</i>	OVIS ^m 50	Cn 285.6	CAP ^m 30[
Cn 328.8	<i>ma-ra</i>	OVIS ^m 50	Cn 328.9	CAP 40

* *pa-ra-jo* sheep.

It is true, too, that just as a relatively high proportion of these 'two-flock' shepherds/herders (and particularly those named in two separate records, rather than in sequence on the same record) are shepherds of *pa-ra-jo* sheep, so a relatively high proportion of shepherds of *pa-ra-jo* sheep occur among the shepherds on Cn 655 + 719 whose names recur on Cn 131 (four out of twelve). Note, moreover, that in the case of one shepherd who appears both on 131 and on 655 + 719, whereas the number of animals in each of his two individual flocks is not a neat multiple of ten, such as we find on the D tablets at Knossos, the total of the two figures is such a multiple (see the figures for the sheep of *ra-pa-sa-ko* = 91 + 69 = 160). Note, too, the figures for the sheep of *a-ta-ma-ne-u* (140 + 60 = 200: a flock total commonly found at Knossos). (On the other hand, the totals in a number of other cases of 'two-flock' shepherds are not neat multiples of ten.) Against this, however:

(i) Most of the 'two-flock' shepherds listed in the table above are associated with animals of two different species (though always of the same sex), whereas all the shepherds whose names are common to 131 and 655 + 719, with the exception of *pu-wi-no*, are associated with OVIS^m.

(ii) Even allowing for the fact that the format of a record may change according to the type of information to be recorded, the differences in format between 131 and 655, 719 and 643 (all three of which are closely alike in arrangement) are difficult to reconcile with the view that all four tablets are part of a single set of documents. Note also that whereas 131 contains check-marks, the three other tablets do not.

(iii) Whereas on 655, &c. the entries for each district dealt with begin with records of *pa-ra-jo* animals, there are no such entries on 131.

(iv) L. Godart has drawn attention to the fact that the total number of *pa-ra-jo* animals listed on Cn 40 and Cn 655 in connexion with the place *ma-ro* is exactly equal to the number of OVIS^m shown on the same records and on Cn 719 in connexion with (a) *ma-ro* and (b) *a-ne-u-te* (a place which there is good reason to suspect lay close to *ma-ro*), including OVIS^m in entries which contain a "collector's" name, but excluding those in entries which contain both a "collector's" name and the term *a-ko-ra*.²³ It is difficult to believe that this equality in numbers can be due merely to chance, particularly since Godart has pointed to another example of what appears to be the same phenomenon elsewhere in the series.²⁴ If, however, 131, which also refers to *ma-ro*, belongs to the same set of records as 655 + 719, and we have to take account in our calculations of the additional (non-*pa-ra-jo*) OVIS^m which it contains, Godart's equality in numbers will no longer exist.

All in all, therefore, it would seem best to reject Palmer's explanation of 131, and to take it rather, as L. Godart has suggested,²⁵ as dealing (a) with real flocks and (b) with a fresh allocation of animals, presumably for a new herding season, to some of the shepherds who are listed, presumably with their past year's flocks, on 655. The following points can be made in favour of this explanation:

(i) As we have just noted, L. Godart has shown that the number of *pa-ra-jo* animals on Cn 40 and Cn 655 + 719 equals the number of OVIS^m in various other categories. As he also shows, the numbers in *pa-ra-jo* groupings tend to be much larger than those in other flocks. It would

seem an inevitable conclusion from this that some OVIS^m are recorded twice on these records; and the most plausible explanation of the duplication would seem to be that at some stage in the year under review certain smaller flocks of male sheep have been reorganised into larger groupings: most likely, since they are described as */palaioil*, 'old', with a view to their eventual replacement.²⁶ [Are these animals which having served their time in wool-producing flocks are now being fattened for slaughter?] Clearly, if this explanation of the duplication is correct, the shepherds of the original smaller herds, and perhaps also the shepherds of the 'old' flocks, if these were destined for slaughter, will have needed to be issued with replacement flocks at the beginning of the next herding season.

(ii) Whereas the numbers of animals credited to shepherds who appear both on 131 and 655 + 719 are in most cases of the same general order of magnitude, the OVIS^m figures on 131 are normally larger than those on 655 + 719, and involve more multiples of ten.²⁷

It must be admitted, however, that although this is likely to be the correct explanation of 131, some puzzles about the details of its relationship to Cn 655 + 719 + 643 (and to Cn 40, which also refers to sheep at *ma-ro*, and its close relative Cn 599) still remain. Cn 131 lists a total of twenty-five herders, and a total of 2371 (+ ?) animals (2127 (+ ?) OVIS^m, 135 OVIS^f and 109 CAP^f). 655 + 719 + 643 list a minimum of thirty-five different herders and a probable minimum of 3004 animals (2326 (+ ?) OVIS^m, 397 (+ ?) OVIS^f, 148 CAP^m, 93 CAP^f and 40 SUS^f). In addition, there are twenty-one different herders on Cn 40 + 599, plus a total of 1677 animals (975 OVIS^m, 210 OVIS^f, 235 CAP^m, 170 CAP^f, 87 SUS^f). Of the 3301 (+ ?) OVIS^m on 655 + 719 + 643 and 40 + 599, a minimum of 1300 are *pa-ra-jo* animals, i.e., if Godart is right, sheep which have already been listed in entries concerning non-*pa-ra-jo* OVIS^m elsewhere in the relevant records. If we subtract 1300 from 3301, we are left with a minimum figure for OVIS^m on 655, &c. of 2001, as compared with the 2127 (+ ?) OVIS^m on 131. Are the latter the replacements for the former? But if this is the case (as does seem possible), how do we account for the great discrepancy between the figures for animals in other categories on 131 and on 655, &c. (where there are many more entries dealing with OVIS^f, CAP^m, CAP^f, and SUS^f)? Was there originally a further record of the same pattern as 131 on which replacements for these animals were noted?²⁸

And what, finally, of the considerable discontinuity between the names of the herders in the two contexts? As we have seen, of the twenty-five herders on Cn 131, twelve (i.e., approximately half) recur on 655 + 719 + 643, but a further thirteen do not; and of the thirty-five different herders named in the surviving entries on 655 + 719 + 643, twenty-three fail to recur on 131. Part of the reason for these discrepancies may be that 655, &c. (where many more herders are recorded) lists both *pa-ra-jo* and non-*pa-ra-jo* flocks, i.e., if Godart is right, both flocks which were entrusted to shepherds at the beginning of the previous herding season and the larger flocks that were formed later in the year when these animals were returned. It is still surprising, however, that so many of the shepherds who are shown on 131 as evidently receiving new flocks fail to appear on any of the surviving records dealing with the same areas in the previous herding season; and one wonders whether the reason for this is that there was a considerable annual turn-over in shepherds willing (or being required) to offer their services to the centre as shepherds of palace-owned flocks. If, as we have suggested earlier, shepherds at Knossos suffered rather than benefited from their responsibilities as herders, through being required to make good from their own resources any losses from the palace's flocks, and if the same arrangement held good at Pylos, a significant turn-over in shepherds from one year to the next would clearly not come as a major surprise.

Appendix

In a recent study, D.C. Snell has suggested that there is evidence in ancient Near Eastern records for a situation which is similar to that which we have envisaged above as a possible explanation of some of the features of the D records at Knossos and the Cn records at Pylos viz. an annual reassignment of flocks to shepherds, and a high turn-over of shepherds accepting responsibility for palace herds, due to the lack of incentive for them to do so. Snell's suggestion comes in the course of a discussion of herding contracts at Lagash in the Ur III period; and he writes as follows²⁹:

Because herds cannot usually be traced by their similar numbers from one year to the next, it seems that the usual practice was for administrators to reassign sheep to new shepherds after the plucking and in numbers unrelated to last year's herds. But since relatively few herdsmen actually do repeat during the best attested years, we may guess that the responsibility was not one that was much coveted or very lucrative.

I understand, however, from participants in the Barcelona meeting that not all who have studied this material draw the same conclusions as Snell has done from these records.

NOTES

- 1 Killen 1964b.
- 2 See e.g. Ventris and Chadwick in *Docs.*: 197f.
- 3 For calculations of the total number of sheep recorded on the D tablets see Olivier 1967.89; *id.* 1972.25–27; *id.* 1988.264–267. On the likelihood that the D records relate to the central area of the island (whereas the Co tablets, in hand 107, relate to the Far West) see Killen 1977.41.
- 4 Primentas 1959.23 (figure derived from the National Statistical Service of Greece *Bulletin*, 1956).
- 5 Not only do we have no mention of meat in records of rations for workers: the numbers of animals listed in contexts where we may be reasonably certain that livestock for consumption are being recorded (such as PY Un 2 and Un 138, on whose probable function as records of food being assembled for some kind of ceremonial banquet see Piteros, Olivier & Melena 1990.171–184) are invariably relatively small.
- 6 For evidence, see Killen 1964b.7.
- 7 See e.g. the following entry in the accounts of St. Swithun's Priory, Winchester, relating to its flock at Hannington in 1324: 'Multones. Restauretur falda ita quod sint in toto ccl.'
- 8 For the detail, see Killen 1964b.9 n. 47; *ibid.* 11 n. 58.
- 9 For figures for average fleece-weights deducible from Ur III Mesopotamian records (and for figures from a number of other societies) see Waetzoldt 1972.17–23.
- 10 For the comparison of Df 1121 with Dk 1076, both concerning the flock of the shepherd *ti-mi-za* at the place *ku-ta-to*, see below. For a full list of correspondences between the Dk tablets and the Da-Dg records, see Olivier 1967.88f.
- 11 See e.g. Drew 1947.32 (quoted in Killen 1964b.11 n. 58): 'At Littleton in 1324 the reeve [an official] was charged 43s. ld. because his fleeces did not average 2 lb. per wether or ram, 1 1/2 lb. per ewe, 1 lb. per hogaster, and 1/3 lb. per lamb.'
- 12 See e.g. Kraus 1966.27.
- 13 For this suggested explanation of the 'owners' or 'collectors', see Killen 1979.176–179.
- 14 Killen 1964a.89–93.
- 15 Killen 1964a.81–85; *id.* 1972.435f.
- 16 Cf. Killen 1969.32.
- 17 For this as the percentage allowed to shepherds in the ancient Near East for losses to the flocks in their care over a year, see e.g. Kraus 1966.36–38.
- 18 For this practice at Larsa in the Old Babylonian period, see Postgate 1975.6.
- 19 For shepherds in the Near East having to make good losses to the flocks they held under herding

- contracts (though in this case only losses 'in excess of the agreed ratio' [see n. 17]), see Postgate 1975.6; for the possibility that shepherds in the Near East used their own animals to make good losses in centrally owned flocks in their care, see Kraus 1966.63; Morrison 1981.284.
- 20 Note, however, the similarity between the Pylian flocks and those recorded on C(4) 911 and C(4) 912 (and evidently totalled on C(4) 917) at Knossos. These are single-sex flocks, and involve both sheep and goats.
- 21 Lang 1966.
- 22 Palmer 1963.165f.
- 23 Godart 1970; *id.* 1971.93f.
- 24 *ibid.* (In this case, the calculation involves the *pa-ra-jo* sheep at *wa-no-jo wo-no*, *e-ko-me-no*, *pi-*82* and *wi-ja-we-ra*.)
- 25 Godart 1971.92f.
- 26 The only alternative would be to take *pa-ra-jo* here as having the sense "last year's" (as it sometimes does on the records: see Killen 1972.438–440); and to take the *pa-ra-jo* flocks as animals which had been returned *two* years previously, and which had been held in special (large) groupings (over the winter?) before being re-allocated for the next herding season (i.e. the season previous to that with which Cn 131 is dealing).
- 27 It is true that the figures on Cn 655, &c. include some (like OVIS^m 100 on Cn 655.18) that appear at first sight to be difficult to reconcile with the view that they represent the numbers in flocks which have been handed in at the end of a herding season (by which time some losses are likely to have been sustained). The explanation of these figures, however, might be similar to that suggested above for the similar round numbers in flocks at Knossos.
- 28 Cf. Lang 1966.253.
- 29 Snell 1986.139f.

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NEO-BABYLONIAN SHEEP AND GOATS

G. van Driel

(Leiden)

I Introduction

Most of the available information about Neo-Babylonian animal husbandry derives from the temple archives of Ebabbar in Sippar and Eanna in Uruk. If the breeding of cattle, sheep and goats and poultry seems to constitute an integrated system in these archives, that impression is derived from the special needs of these institutions, which required considerable quantities of animals suitable for offering to the gods. This could tend to obscure the importance of sheep as producers of wool, which is less obviously documented and which would be of much greater relative importance in big private herds. For these we are virtually restricted to the small appendix to the Murašû archive dealing with the sheep belonging to the prince Aršam. The few herding contracts preserved from the Neo-Babylonian period are of vital importance for our understanding of the aims of the owners of the herds.

The documentation from the Neo-Babylonian period is one-sided, all documents come from the owners. We must therefore first understand the organization of sheep husbandry if we want to interpret the documentation. Though at first sight the Sippar and Uruk organization and sheep-breeding terminology seem remarkably similar or at least comparable, there are nevertheless fairly essential differences in organization. The actual terminology used differs sufficiently to exclude confusion between the archives.

The nomenclature of animal husbandry, especially of sheep- and goat-breeding has been placed on a firm footing by Landsberger,¹ but much additional interpretation can be found in the Dictionaries, especially in the CAD. This terminology, which still retains its obscure areas, must be re-examined here, as behind the terminology lies the actual practise of husbandry. The interpretation of the terminology determines the understanding of actual practise. Although this is an unsatisfactory situation, we cannot improve on the documentation.

Though separate herds of goats do occur, sheep and goats were usually combined, the goats no doubt serving as leaders of the flock which made control easier. But there are no flocks of sheep and goats in combination with cattle. When people are held accountable for both categories they belong to what might be called managerial levels. We must differentiate between that part of the documentation belonging to the flocks directly managed by the temple personnel and its administrative supervisors, and the flocks managed indirectly, through written, and possibly unwritten, contract. Though connected, purposes could be very different.

As in other fields of economic activity there is an important difference in emphasis between the Sippar and the Uruk archives. What is published from Uruk is distinctly biased towards managerial aspects, exemplified by the considerable number of documents dealing with backlogs in delivery and with (presumed) embezzlement.² From Sippar most of our information derives from the remnants of the day-to-day administration. A glance through the BM Catalogue volumes³ hints at the wealth of the unpublished material from Sippar. Only a long-term campaign of joining and study can make this material available for interpretation and quantification. What is presented is no more than an impression. A full study of the Sippar material promises an insight into the long-term effectiveness and the short term fluctuations, as the fate of individual flocks can be followed in detail. This stage is nowhere near realisation.

II Types of texts

The Uruk and Sippar texts that are available are the result of administrative routine. Though those involved in actual breeding and herding play a prominent role, and though the basic information is provided by them, the documents contain what the administration wanted to know. The documentation reflects, as always, the interest of the owners, or their top-level managers. Those immediate interests will be studied in section III, here we will try to define the relevant text groups.

In both Uruk and Sippar – this is no doubt also valid some way or another for private herds – the number of animals in individual herds or at the disposal of individual herdsmen were regularly inspected. In the institutions this was called the *amirtu*,⁴ and it seems clear that the moment at which the inspection was carried out was when the sheep were shorn. But there were certainly other occasions when stock was taken. The procedure is an essential element of accounting, and there were formal arrangements as to who was charged with it.

The procedure dates from before the beginning of the Neo-Babylonian period. BRM I, 4 (23.iv.1.Nabû-našir) is an early example from an unlocated institution. Most texts of this type from Sippar and Uruk (cf. Appendices III and II) are small, sometimes no bigger than a thumbnail. In giving the constituent elements of a herd they differentiate both sheep and goats according to sex into two age categories, the younger category being the animals of the year of the date of the tablet.

The terminology will be treated in section IV, here we will look at the type of text only. The interpretation of these small texts as the actual on the spot registration of animals inspected is based on the occurrence of blanks. LB 1517 is a good example from Uruk. The categories of sheep and goats are given in the right order, in the terminology used by the Uruk documents, but no numbers are filled in, nor is the name of the herdsman, but the date 16.ii.Nbp.9 is given. The document was prepared for use on a certain date, but left aside. The reason can be explained. After the eight categories of animals the scribe wrote mistakenly *PAP šá* (blank) “all of”. At this time the documents give a separate line for the total, followed by a further line *ina IGI PN*, “at the responsibility of PN”.⁵

The assumption that this PN is the name of a herdsman is likely. Though in Uruk many of these men occur only in one text of this type, others are mentioned with proper qualifications in other texts about sheep. The *ina IGI* indicates that the sheep and goats are placed with the individual mentioned by someone else, in this case the administration of Eanna.⁶ The *ina IGI* used in Uruk texts is unequivocal. Most available texts of this type from Uruk belong to a series running from Kandalanu yr. 9 to the beginning of the reign of Nebukadnezar II, but there is clear evidence that the Uruk administration continued to use this type of document and even expanded it somewhat by giving subtotals and remarks about deliveries and backlogs, including those in wool and goat-hair.

In Sippar the available series is much shorter: up to the late reign of Nabopolassar. The basic division of the animals is again in eight groups, but totals are rarely given, and the name of the presumed herdsman follows without any accompanying remark, or preceded by a *šá*, “of”, which should be interpreted in a neutral sense, not in that of “owned by”. A few texts place the word *qabuttu* before the name of the herdsman. The meaning “corral, fold” supplied by CAD (Q p. 42) makes clear that the man who is mentioned is the herdsman responsible.⁷

These small “on the spot” herd inspections are difficult to read especially there where the form does not supply certainty: the numbers of the animals, the names of the herdsmen, and the dates. This difficulty is obvious in Appendices II and III where the names of the herdsmen are concerned. In those cases where summaries are provided, rare in Sippar but the rule in Uruk, numbers can be checked. It is, however, perhaps fairer to use the word “adapted”. Comparison with the original publication will indicate emendations and substitutions which are not explained in detail. Sometimes not even this type of manipulation is possible. The numbers should all be regarded with diffidence, but in general they approach what was intended.

In Uruk the production of these small “on the spot” single herd-texts seems to have continued. It is too early to regard this fact as the explanation for the relative absence of the other important type of text on the composition of herds. These are the tabulated lists which in their heading mention date, occasion, and sometimes place. They use the same local terminology for the eight categories of animals as the “on the spot” texts. They provide subtotals and totals, the names of the herdsmen, and remark occasionally on what he is to deliver, both in livestock and in wool. Here again one finds occasionally shallowly impressed signs indicating that supplementary information has been added to a tablet written earlier. Many of the Sippar documents of this type I have seen are only partially used. Sometimes they have a elongated thickish sausage shape. The occasion and date of the document are often written on the upper edge which suggests a particular method of filing.

As noted above few texts of this type from Uruk are available.⁸ It is clear from the dates that they were compiled concurrently with the small “on the spot” texts, much of the information found in the tabulated ledgers probably being derived from the small texts. Further publication of material will settle the question whether the tabulated documents replaced the small texts completely in Sippar.

The two types of texts mentioned are our most important evidence for the size and constituents of Neo-Babylonian herds. But this assertion should immediately be qualified. For what they list is what was owned by or was due to, one particular owner. The contracts studied in the next section indicate that (at least some) of the herdsmen had private interests in the herd leased by the owner. The possibility cannot be excluded either that herdsmen accepted animals from different owners. Especially in Uruk it is plain that the *nāqīdu* class of herdsmen, as entrepreneurs with various interests, will not have been the actual shepherds. Actual herdsize and composition will have differed from what is found in the texts. When using these texts looking for evidence about herding practises this should be kept in mind.

Tabulated documents, using the same terminology as the texts mentioned above are, of course, also ideal for compiling long-term records concerning individual herdsmen. This type of document, illustrating “the growth of the herd” is potentially much more important, because trends become visible even though possibly only the segment of a total herd belonging to one owner is registered.⁹

There are, of course, many documents about the accounts and backlogs of the herdsmen. As these in general do not mention the total amount that was due, but only what is outstanding these texts contribute little to the study of herding practises.¹⁰ The same is true for documents on deliveries by herdsmen: amounts cannot be related to the total due.

The documentation about the “internal” herds is embedded in the general administration of the temples. There are certain changes in terminology as soon as the animals are being prepared for

use within the temple organization, as will be seen in the section on terminology. Information about fattening practises must be drawn from all types of texts dealing with the general administration of barley and emmer, only incidentally do such texts deal with fodder alone. The administration concerning dead animals from the internal sheepfolds, though meticulous in both Uruk and Sippar, cannot be quantified at present. Lists of the actual animals slaughtered as offerings and consumed¹¹ by the personnel of the temples contribute to the understanding of the aims of breeding and selection.

Much of the information about wool and hides is likewise found in the general texts about expenditure of the Uruk and Sippar temples. The actual delivery of wool (and hides) by the herdsman is not very well documented in the Neo-Babylonian period. Some of this can be explained by the assumption that much of the wool due did not even enter the storerooms, but was sold, so to say, on the sheep. The temples did not have a separate administrative department dealing with sheep or livestock in general. All information from private archives is haphazard.

III Contracts: Aims

The texts from Sippar and Uruk reflect the interests of the administrators who managed the herds for their human or divine owners. In those cases in which a formal contract between the (representative of the) owners and the herdsman was made, that herdsman virtually became an entrepreneur. This is the almost inevitable result of the conditions under which large-scale sheep breeding was carried out, for the owner was unable to exercise direct supervision. The suspicion remains that actual contracts were not always drawn up, but that relations could also be governed by custom.¹² We must also assume that an owner could engage an administrative manager. This might be the case in the documents concerning the herds of the Achaemenid prince Aršam, where the (former?) Murašû servant Enlil-suppe-muḫur engages herdsman to serve under a *rab būli*. Otherwise a herd, or part of it could be farmed out by an institution. This would appear to be the case in Uruk where the *nāqīdu*'s were not the actual herdsman but also had interests outside the world of herding. We must assume that this type of leasing functioned in Uruk alongside and over the ordinary external organization of *rē'u*'s (cf. p. 224) under *rab būli*'s, who were at least nominally placed over these herdfarmers.

That the relations between herdsman and owners were regulated by custom is clear from BE 10, 105:10 and 106:9 and UMBS 2/i, 118:8, three contracts with the same date between the Murašû servant Ribat and several herdsman which state that the herds are *ana* GIŠ.BÂN, *ana* *sūti* at the disposal of the herdsman, but no specifications are given.

a. The Aršam contracts The contracts illustrating these facts are well-known, but their contents must be reiterated here. The nine contracts dealing with sections of the herds of Aršam¹³ contain a number of standard clauses:

1. per annum 100 ewes (*u_g*) produce 66 2/3 lambs¹⁴ for the owner. The basis for the calculations must have been the number of ewes of proven fertility mentioned by the contract.
2. per sheep (1-*it* UDUNITA₂-*tū*) a yield (*gi-iz-za-as-su*) of 1 1/2 mina of wool is expected by the owner. We must assume that UDUNITA₂-*tū* means "sheep in general", not just female animals.
3. per ewe with lambs one cheese (*gubnatu*) had to be provided. (Size or weight are not specified, again a customary item.) From 100 sheep one litre of ghee is required. We must suppose that in this case UDUNITA₂-*tum* (*a-lit-tum*) / *im-mir-tum* (BE 10, 131:18 cf. BE 10 130:7) always means "ewe that has lambed", and not "sheep" in general. This is not specified explicitly

in all cases. (BE 10, 132:16)

4. each full-grown female goat (*ŪZ GAL-ti a-lit-ti*, i.e. of proven fertility, had to yield one kid for the owner of the herd.

5. per goat (*ŪZ* - but probably intending in this case male and female) 5/6 mina of goats-hair was due to the owner.

6. per 100 animals (*še-en*, i.e. both sheep and goats, and of both sexes) 10 deaths (*mu-ut-ta-tum*)¹⁵ are accepted by the owner, provided that for each the skin (1-*en* KUŠ.HI.A) and 2 1/2 shekel of tendon (*gīdu*) are handed over. The owner therefore replaced 10% of the herd per annum. Anything required above that amount had to come out of the additional increase which would otherwise have belonged to the other party in the contract.

b. An Uruk contract Though these contracts are dated to Nippur it is by no means certain that the herds were present in the Nippur neighbourhood. The Uruk contract YOS 6, 155 (30.ix.Nbn.12)¹⁶ deals with a herd staying in the Tagritenu (i.e. Tekrit) neighbourhood, far from Uruk. The lease is granted by the *šatammu* and temple scribal college on the orders of the crown prince Belshazzar. This is a sign of the outside interference in temple affairs which is also evident from comparable agricultural contracts. The contract is also remarkable in that it becomes valid only after 6 months (iv yr.13). The stipulations are similar to what we have already seen:

1. per annum per 100 breeding ewes 66 5/6 (sic) *ka-lum ū par-rat*, "male or female lambs" belong to the owner;
2. per 100 breeding goats 66 5/6 young goats (MÁŠ.TUR and SAL.ÁŠ.QAR are required;
3. per ram (*puḫal*) and ewe 1 1/2 mina of wool and¹⁷
4. per goat (MÁŠ.GAL and *ŪZ*) 5/6 mina of goats-hair are due;¹⁸
5. per 100 animals (*še-e-ni*) 10 *di-ik-tum*, "dead", are allowed (*ul-tu É.AN.NA i-na-aḫ-ḫi-su-ú-nu*)

The contract does not mention dairy products nor is anything said about skins and tendons as proof that animals are really dead. Are these omissions intentional or are these dues customary to such a degree that they are automatically implied?

The "herdsman" in spe of this mixed herd of 2050 head of sheep and goats had earlier relations with the temple. For he promises that before he will enter on the contract – perhaps this explains the delay – he will deliver 20 rams, 400 sheep, 160 male and 320 female lambs¹⁹ with 50 female goats, 20 young male and 30 young females, in toto 1000 heads as part of a debt due since month i yr.13. Earlier debts are mentioned but not specified.

The intervention of the crown prince, the size of the herd and the extent of the debt suggest that the "herdsman" Nannā-aḫa-iddina son of Laqipi was some sort of an entrepreneur. His brother (?) Nabû-naṣir s. Laqipi is also connected with herds at Tagritenu by YOS 7, 143:20.

The high connections of the herdsman make it difficult to assess the meaning of YOS 6, 155. Was the entrepreneur unable or unwilling to deliver what was due to the owner?

Especially from Uruk, but also from Sippar there are many texts dealing with the sometimes considerable debts and backlogs incurred by "herdsman". This matter is very important for the question of the productiveness of Neo-Babylonian herding. If the entrepreneurs were protégées of the crown who had a more or less open account with the institutions, the texts about debts distort the picture. These people reneged on payment of what was due. In this they differ probably from

smaller ("real") herdsmen who could be forced to pay what was due, and had to settle accounts by relinquishing part of their property.²⁰ It is difficult to come to grips with this problem which is central to our understanding of Neo-Babylonian entrepreneurship. The backlogs are probably more a problem of the relationship owner - "herdsman" than of sheep-breeding as such.²¹ The real profitability is not entirely revealed by the texts.

The available detailed contracts deal with cases in which the owner did not live close to the area in which the herds grazed. That makes wool the most important product. What was done with the young animals (not needed for the maintenance of the herd) is not indicated by the contracts. They could be used for the increase of the flock, or, as far as the males are concerned, might be removed.

c. A private contract BE 8, 63 (6.x.Cyr 4)²² is a contract dealing with 14 ewes, 6 male lambs (*kalūmu*) and only one female lamb (*parratu*), together with two full-grown female goats and one young one. The lease is *ana zitti* which means that the owner is to receive annually a share in the increase in the herd (*talittu*) and wool (*gizzatu*) to the value of 32 š.²³ The contract runs for four years, after that the owner and the herdsman will share the proceeds. They also share the *šibtum*, "taxation".

This type of arrangement will have been general for small owners who placed their sheep with a professional herdsman. There do not seem to be more traces of these contracts. Perhaps the debt - not easily collected? - of 2 mina silver, 1 *biltu* of wool and a *šimdu* (3 SILA₃) of ghee in the Egibi text Nbk 188 (19.vii.Nbk 28) betrays a comparable arrangement. Cf., perhaps, also Dar 541 (3.iii.Dar.22). Smaller private herding arrangements may easily remain hidden between debtnotes, as so many other transactions are.

IV Organization

As indicated by the organization of herding in both Ebabbar and Eanna sheep breeding in both Sippar and Uruk had at least two aims. There is an internal organization which provides the animals required for the cult functions along different lines from the external organization, which, at least in part operates at considerable distances from the towns where the institutions have their abode.²⁴ Especially in Uruk it is obvious that (some? of) the external herding was contracted out.²⁵ The internal and the external organization are, of course, not completely separate, there is a constant flow of especially young male animals from the external herds into the internal ones. Especially the external herds produced wool.

1. External organization

a. Uruk The personnel involved in the animal husbandry at Uruk has been studied by H.M. Kümmel.²⁶ He has reconstructed a three-tiered hierarchy: *rab būli* - *nāqidu* - *rē'û*, paralleled by the military organization of the "bowmen of the shepherds", led by "decurions" (*rab ešerti*) - who are also found with other professions. Kümmel did not differentiate explicitly between the internal and external organizations, but his hierarchy belongs to the external herds. The fundamental difference is that the personnel of the "home herds" figures in the ration lists, whereas the extramural personnel does not. This underlines the difference in status. The external herdsmen derive their sustenance from their herds, they are in a way all entrepreneurs on a larger or smaller scale. The Uruk *nāqidu* is, as YOS 6, 155, cf. section III, indicates, sometimes a person with considerable holdings and connections. Though in theory he operates under the (or his) *rab būli* the position of the *nāqidu* is ambiguous. Nannā-aḥa-iddina son of Laqipu of the contract YOS 6,

155 and his brother (?) Nabû-našir son of Laqipu, are with their share of 790 and 780 sheep respectively, by far the most important providers of sheep and wool under the *rab būli* Arad-Bêl in YOS 7, 83 (date lost).²⁷ We must assume that all the persons mentioned in YOS 7, 83 and similar texts had taken up the lease of segments of the (external) temple herds, and that the *rab būli* was involved in collecting what was due to the temple.

The *rab būli*'s²⁸ belonged to the *nāqidu* group in Uruk. Their position is perhaps best illustrated by YOS 6, 26²⁹ in which Iqīšā s. Nannā-ereš, called here *nāqidu* of Bêlet of Uruk leases arable from the temple in order to obtain a *maškattu* "a place where to keep his herd". The text not only tells us that he had herds amounting to 2000 sheep and goats (*sēnu*) and 500 cattle, but also that he was willing to pay a rent for the land consisting of 400 kor of barley, an unblemished ox and ten sheep. This suggests that this *nāqidu* also engaged in arable farming. Both he and his brother Zêrija became a *rab būli*.³⁰

These *nāqidu*'s were not themselves the actual herdsmen,³¹ the herding was left to the *rē'û*'s. As Kümmel has made clear their position differed from that of the *nāqidu*'s. In TCL 12, 119³¹ ([?].v.Nbn.17) one of the (original) parties in a *ḥarrānu* contract, Nabû-šum-ibni s. Marduk, is qualified as a *nāqidu*, the other, Nabû-zêr-iddina s. Šardanu, is not. The text is a protocol concerning an investigation by the central administration of Eanna instigated by the *rab būli* Iqīšā s. Nannā-ereš (long?) after the death (iii Nbn yr. 8? cf. line 15) of the *nāqidu*. In yr. 7 he had made a *ḥarrānu* contract for a period of five years with Nabû-zêr-iddina concerning 20 sheep, according to which Nabû-šum-ibni would receive his *pūt zitti* "(preferential?) share" in increase and wool yield. This is obviously a clause understood by all concerned because it remains unspecified. The problem was what had become of the sheep. Nabû-zêr-iddina could show (line 11) a debtnote for 12 sheep from Nabû-šum-ibni and the registers of the sheep (of the temple) were consulted (lines 14-5, damaged). Though lines 16-18 are incomplete the meaning seems to be that a debtnote produced by Nabû-zêr-iddina mentioning Mukkea brother [of Nabû-šum-ibni³³] was declared false. The protocol ends at this point.

This much seems clear: the *nāqidu* Nabû-šum-ibni concluded a deal of the *ḥarrānu*-type with temple property which was at his disposal (line 3: *ina panišu*) with a person who had dealings (as a *rē'û*?) with temple sheep.³⁴ TCL 12, 119 suggests that *nāqidu*'s put out the sheep they managed to others. This illustrates the term the *rē'û ša nāqidi* and similar expressions discussed by Kümmel (1979 p. 50).

In Uruk the *nāqidu* was a person with sometimes wide ranging interests in cattle and sheep herding and in arable farming. As an entrepreneur he had acquired a position between the temple-administration and its herds in the external organization of sheep breeding.

b. Sippar As far as can be seen, the *nāqidu* does not occur in Sippar, but the *rab būli* is known, though he is attested less frequently than in Uruk. This could suggest that the Sippar administration had a much bigger grip on management.³⁵ Though the documentation is not plentiful it would seem that the Sippar shepherds are organized in local groups (so-called "tens").³⁶

Whether in Sippar - as in Uruk - at least part of the herds were kept far from their owners depends on the localization of a place called Rusapu. This was obviously an important centre of sheep-breeding and the seat of a *ša rēš šarri* with the title and function of *rab šibti*. This indicates that he was in charge of the taxation of herds.³⁷

The temple obviously attached value to contacts with this official. In order to reach Rušapu boats had to be used, perhaps for only a part of the trajectory. The importance of Rušapu for the herding activities of the Sippar temple is indicated by the fact that officials were sent there in order to investigate into personnel that had fled.³⁸ Zadok³⁹ accepts the localization of Rušapu in the Nisibin area. This implies that elements of the Sippar herds were far away, comparable to the Uruk herds at Tagritenu. It should be noted that the contacts with Rušapu took place in the shearing season, i.e. in "spring" when a seasonal movement to the South would have been possible.²⁶

As in Uruk, the Sippar herdsmen had to contribute to military contingents of bowmen. In Uruk their duties were directly connected with herding, with a guard house on the Tigris being manned by them,⁴¹ but in Sippar on the other hand they seem to have belonged to a contingent to which other dependants of the temple also contributed. The connection with herding seems to be less direct.⁴²

2. Internal Organization

a. **Uruk** The internal organization is represented in Uruk in the first place by the *rē'û ginê* or *sattukki*.²⁶ As his title suggests he was primarily responsible for the provision of suitable animals for the offerings to the gods. Presumably he kept his herd in the neighbourhood of the institution.

The other element of the internal organization is the *bīt urê*, the "stable", which was presumably primarily a fattening establishment, not only for sheep but also for cattle and fowl. Fowl were actually bred in this institution. The personnel of the *bīt urû* in Uruk belonged to that category of workers which received wages.⁴⁴

Both branches of the internal organization received sheep not only from the external herds, but also from other sources, especially the royal herds. TCL 12, 123 lists all royal contributions to the offerings of cattle and sheep for the years Nbn. 1 to 6 and for the first three years also the fowl.⁴⁵ This extraordinary but fairly regular supply was supplemented by other *irbu* in animals.⁴⁶ They seem to have been disposed of in an ad-hoc manner, as this source of income was probably too irregular. It is possible that some breeding was done in the herd of the *rē'û sattukki*⁴⁷ for YOS 17, 82 (10.xii.Nbk.14) assigns 34 ewes to him. His herd also contained goats though there is no explicit archival mention of goat offerings, as far as I can see.⁴⁸

There are of course many texts similar to the *irbu* texts which do not use the word. The relative unimportance of *irbu* sheep is illustrated by YOS 7, 8 (1.iii.Cyr.1) where out of a "capital" of 7036 sheep and 19 goats only 261 sheep are qualified as *irbu*.⁴⁹

b. **Sippar** In Sippar as in Uruk we find on the one hand the *rē'û sattukki* or *ginê*⁵⁰ and on the other the "stable", with its three departments for cattle, sheep and fowl.⁵¹ The stable belonged to the *qabal āli*, "internal" organization of the temple and its personnel appears under that heading in the ration lists, e.g. CT 56, 677. In CT 56, 688 and CT 55, 510 we find 11 persons listed as working in the ÉUDU.NITA₂, in CT 55, 486 there are only 6. They were directly employed and received rations in food and textiles (CT 56, 681). Their task was, as at Uruk, not so much sheep breeding as sheep fattening.

Though goats stray occasionally into the ÉUDU.NITA₂, or into the *sattukku* herd, they are invariably disposed of for non-cultic purposes.

c. **Sippar: putting out of sheep** Though it cannot be said with absolute certainty that the phenomenon did not exist in Uruk⁵² a speciality of the Sippar system of producing sheep for the

cult seems to have been the custom of (obligatory?) care of one sheep belonging to the temple by certain categories of houses. Seen from the temple the procedure is regarded as *paqādu* "entrusting" by the temple to the respective houses. These were on the quay (CT 44.72, 12.ix.Nbk.6, cf. CT 55.163, [?].Nbn.5) and the *mašennu*-Canal outside the town. Certain "gardeners" were also subjected to this obligation (CT 55, 603, 23.xii.Nbn.2). Though no reasons are given, the care for one sheep belonging to the owner is perhaps a general obligation for all tenants of the temple.

The fragmentary account of sheep with an official whose name is damaged CT 55, 594 (line 3) mentions among the "capital" 106 (!) sheep in houses in Sippar and 125 in houses on a canal of which the name is lost (lines 6 and 7). Camb 256 (13.xi.Camb.4) is of some interest. It deals with sheep entrusted to LÚ.ERIM₂.MEŠ, perhaps best translated as "members of the personnel". A number of individually placed sheep receive 0.1.4.0, or 60 SILA₃ i.e. 1 SILA₃ per day during two months. The sheep came from the *bīt urû*.

That this putting out was not without risks, is illustrated by CT 55, 492 (29.xi.yr. lost): out of 91 sheep (placed) in "houses" 31 are stated to have died. The connection with the *bīt urû* and the (occasional?) provision of fodder confirms that the putting out system belongs to the internal organization. In VS 6, 10 (16.viii.Nbp.12) both sheep delivered by (external) herdsmen and collected (verb used *abāku*, "to drive away") from houses at Sippar are delivered to the *rē'û ginê*. Why certain deliveries went to the *rē'û ginê* and others to the *bīt urê* is, as in Uruk, not clear.

V Dates

In view of the circumstantial nature of the information provided, "the shepherd's year" would be too arbitrary a heading. Yet the clustering of certain types of texts around certain dates must reflect herding practise. As the relationship between herdsman and owner – the herdsman tending his own flock does not produce documents, it would seem – is, whether written or not a contractual one, the date at which the contract starts or is renewed must be significant.

The contracts with herdsmen made by Bêl-suppe-muhur in the 11th year of Darius II all date from the second half of the sixth month. BE 9, 1 (Art.II yr. 1) though dated on 28.VII actually ran from 1.VII. A reason for these dates is not given, but if lambing around November was intended the end of the sixth month is about the last moment the herdsman could supervise the tugging. As his contract contained provisions about the number of young animals to be delivered he had a direct interest in this matter.

The dates of the herd inspections (in Uruk predominantly months III-V, II-IV in Sippar) would seem to reflect the interest of the owners in the wool crop.⁵³

These are suppositions which do not seem unreasonable, but direct evidence is haphazard.

1. Lambing

Purely anecdotal is YOS 7, 140. Someone declares ⁽²²⁾ ... 1-en UDU *pu-ḫal* ⁽²³⁾ ù 5 UDU.U₈.ME *ša qaq-qab-tum še-en-du ina* ⁱⁱⁱAPIN MU.2.KĀM *pa-ni-ia ta-ap-te-qid* ⁽²⁴⁾ *ina* ⁱⁱⁱZIZ MU.2.KĀM UDU.U₈.ME.A.AN 5-ta *ina pa-ni-ia it-tal-da-'a* "one ram and five ewes marked with the star (of Ištar) you entrusted to me in month viii of year 2, in month xi of year 2 those 5 ewes lambed in my presence". A winter lambing certainly, and one lamb per sheep at that, but not too much weight can be placed on this type of evidence.

If we could understand TCL 13, 162 (26.x.Camb.3, from Uruk) better, it would tell us much more. A *rab būlu*, Zērija s. Nannā-ereš, promises to deliver between 1.xi and 1.xii 355 UDU *ka-lum* A.MU.AN.NA *i-na re-ḫe-šu ù ina re-e-ḫe ša* ¹⁶NAGADAME “355 (male) lambs from what is still due from him or from the herdsmen (belonging to his resort)”. The date of the contract, 8th of January, falls late in the likely lambing season and the delivery date is certainly after it, but the *mar šatti* (A.MU.AN.NA) must mean something special. CAD M/1 p. 314 states “yearling”. The meaning of *kalūmu* will be discussed in section VI, but does *mar šatti* mean “a year old” or “in its first year”?

Clearer are the Sippar tabulated texts about cattle which give the succession: *pu-hal*, 3-*ú*, 2-*ú*, A.MU, *a-lit-tu*, 3-*tum*, 2-*tum*, TUR.SAL.MU,⁵⁴ indicating that A.MU means “in its first year”. For this reason I do not know whether the *mar šatti* in TCL 13,162 means “belonging to the old crop” (of “winter year 2”) or “to the fresh crop” (“winter year 3”). The backlog existed no doubt on account of non-delivery of animals from the earlier crop, but “loose usage” of the term, probably, could indicate “the old crop”.

More speculative, but perhaps not without meaning, is an argumentation based on the delivery of skins expressly stated to be of ewes. GC I 232 (4.ix.Nbk.3) mentions 60 skins of U₈.GAL.BABBAR.ME, “ewes” on 4.ix.Nbk.3, that is in December, and GC I 24 (15.i.Nbk.5) registers that of 22 U₈.GAL.ME, “ewes”, and 3 ūZ, “nannies”. GC II 290 (18.xii.yr.4) lists 39 skins of U₈.GAL.ME, 2 of ūZ.ME and 1 of a MAŠ. The express statement that these were skins of females could indicate that they were from animals that had died in lambing, or were killed because they were barren. The explicit statement that the skins were from female animals was mainly in the interest of the herdsmen, as the number of young animals they were obliged to deliver was related to the number of ewes with young. It would be of interest to know whether the same phenomenon occurs in other periods. The date of GC I 24 (early April) could of course be used as an indication of a (secondary) spring lambing season, but I do not know whether that is really warranted.

2. Shearing

The evidence for the shearing season is only slightly better, and also in the main indirect. The best information comes from Sippar. Nbn 754 (18.i.Nbn.14) mentions a certain amount of wool ⁽²⁾TA *gi-iz-zu šá še'-e'-nu* (sic). This can be compared with Nbn 952 (20.i.Nbn.16) 12) SÍG.ĪLA TA *gi-iz šá še-e-nu šá PN* ¹⁰SIPAD SÈ-nu and CT 55,761 (26.1.Dar.22) ⁽¹⁾40 MA.NA SÍG.ĪLA *gi-zi* ⁽²⁾šá PN (beginning of line 2 not understood). These passages suggest that wool coming directly from the shearing is transferred to craftsmen. Especially Nbn 754 and 952 are clear in this respect, as Nbn 754 (and CT 55, 761) also mentions wool from store rooms. The new crop of wool was available from late April onwards. The dates for the new wool fit in with the dates for the spring sheep inspections. The word *gizzu* in connection with deliveries of wool seems to occur only in month I.⁵⁵

Tools called *sirpu* used for shearing, or iron for their manufacture are mentioned in later months of the year. That is not remarkable as all metal tools are regularly returned to the blacksmiths for refurbishment. Such will be the case with *sirpu*'s returned by blacksmiths to Ebabbar in Nbn 867 (18.iv.Nbn.15) and Nbn 960 (4.iii.Nbn.16).

In CT 55, 252 (12.iii.Nbn.15) two known shepherds receive respectively 40(?) and 13 new *si-ir-pi* AN.BAR *a-na gi-iz-zi*, which suggests that towards the end of May of that year sheep shearing was still in progress. The same is suggested by Nbk 494 (16.ii.Nbk.36) which mentions iron and oil *a-na gi-iz-zi*. That shearing was a rather protracted affair is also suggested by CT 57,

162 (10.iv.Nbn.16, 20th of June) registering the delivery of food to the *qēpu* in the shearing shed (*būt gi-iz-zi*).

Other information about the date of shearing can be derived from Sippar texts referring to the hiring of ships in connection with the shearing: Nbk 296 (15.iii.Nbk.36), CT 57, 79 (17.iii.N[x].14) and Nbn 856 (21.iii.Nbn.15) mention dates when the season was probably well under way, but CT 55, 600 (19.xii.Nbn.4, April 4th) and Nbn 324 (i.Nbn.9) suggest the date of the beginning of the season.⁵⁶

The evidence is circumstantial but converges on the expected. Shearing starts around the beginning of the year, but, as it is complicated by inspections, markings and wrangling between shepherds and representatives of the owners, it takes several months.

From Uruk there is even less information about shearing. The reason may be a difference in organization, which meant that the temple was less directly involved. Though it is difficult to prove in a general manner the temple in Uruk may have sold much of its wool “on the sheep”.

GC I 394 (?xi.Nbn.5) is a promissory note given by Bêl-našir s. Zêr-ukin *maššar bābi* that he will pay 10 minas of silver for 50 *biltu*⁵⁷ of wool belonging to Ištar and Nannā in month ii. The date of payment suggests a connection with the date at which the wool became available.

This does not mean that for the Uruk herds the moment the sheep went to the shearing shed was not important. YOS 7, 143 (23–4), a text of considerable importance in connection with the management of the Uruk herds, suggests that (especially male) sheep were taken from the shepherd *ina muḫḫi gi-iz-zi* “at shearing”, and transferred to the *urū* (line 2) and the *sattukku* herdsmen (line 3). This is confirmed by YOS 7, 163: 8–10 (13.vi.Camb.4).

There is, as far as I can see, no evidence for a yearly period of slaughter at which the flock was systematically reduced. The purpose of such an action would be to lessen the pressure on scarce fodder. In Mesopotamia that would be either in the dry period of the summer or at the moment the stock of barley ran out before the new harvest.

It is difficult to assess how these two negative factors affected sheep breeding. Lack of barley was perhaps only of importance for the “internal” herds. Dearth of fodder through dryness would make a spring lambing season unattractive in Southern Mesopotamia, but it would be of less importance in the North, where the cold could take a heavy toll from the winter lambs⁵⁸ and where the present situation of overgrazing was probably not reached. The season of the herds in the Jezira may been different from that of herds kept in the South.⁵⁹

VI Terminology

In a certain sense Neo Babylonian administrative terminology about sheep and goats is colourless. In general a sheep is a sheep, a goat a goat, either male or female, either young or old. But there are indications that in reality more ample differentiations were made.

The administrative texts do not discriminate between separate breeds. Only Dar 297, a document belonging to a Sippar private archive (Babylon, 4.ii.Dar.11) mentions ⁽¹⁾30 UDU.NITA₂ *par-ra-tum.MEŠ ak-ka-di-i-tum*, “30 female lambs⁶⁰ of the Akkad breed”.⁶¹ CT 22, 168, a denunciation of a shepherd to the *šangu* of Sippar, mentions 30 *še-e-nu pu-qud-di-tum*⁶² “of Puqūdu breed”. Other than this I have not been able to find any further references to special breeds in this period.⁶³

1. The Aršam group

The discussion about sheep terminology will be dominated by the Aršam texts, which mostly date

from year 11 of Darius II. These texts classify male sheep in three age groups, females in two and billies and nannies both in two also.

Male sheep are UDU *pu-hal*, UDU.NITA₂.MU 2-ú or UDU.NITA₂ DUMU.MU.AN.NA, the females are either U₈.GAL-tu *a-lit-tu* or DUMU.MU.AN.NA.⁶⁴

All texts date from the middle of the calendar year.⁶⁵ *mār šatti* or its female equivalent can only indicate sheep “born in this year”, i.e. belonging to the last lambing season, born at the earliest towards the end of October of the previous year.⁶⁶ An UDU.NITA₂.MU.2-ú is therefore in its second year, or, properly spoken, a yearling.

As the contracts stipulate a fixed number of newly born animals – the texts could suggest an equal number of males and females – per hundred ewes it is logical to expect that the new generation of young animals was counted for inclusion in the documents about herd size. If this was done in the Aršam herds as the terminology suggests it was, then it was also the usual practise in the other Neo-Babylonian herds – and probably in earlier periods as well.

A *puhallu*, a word used for all male animals from bull elephant to drake, is invariably a ram used for breeding. As any ram over the age of one year is or should be capable of breeding, it is not completely clear why the animal is regarded as a separate category. The yearling females are counted, understandably, with the ewes. The question of the “high” number of males and of castration will be discussed separately, as will the very simple goat terminology.

The importance of the Aršam group lies in its clear division of male sheep into three age categories, while establishing that the youngest category was under one year old and was counted.

2. BRM I 4

It is regrettable that BRM I 4 (23.iv.Nabû-našir.1) is damaged in several essential passages. It might indicate a similar division of male sheep at the beginning of the Neo-Babylonian period.⁽¹⁾ [U₈.U]DU.ĪLA *gaz-za-a-ti* MU[1 KÁM?] ⁽²⁾ 22 (?) UDU.*pu-[hal]* ⁽³⁾ 2 UDU *par-[ri?]* ⁽⁴⁾ 331 UDU.U₈(?) ⁽⁵⁾ 10 UDU (?) ŪZ ⁽⁶⁾ 4 UDU (?) SAL+ÁŠ.GAR A A (?) ⁽⁷⁾ [PAP] 369 U₈(!). UDU.ĪLA ⁽⁸⁾ 80 (?) UDU *ka-lum-me(?)ina lib-bi* 25 NITA₂.MEŠ ⁽⁹⁾ 16 (?) UDU.MÁŠ.TUR.MEŠ ⁽¹⁰⁾ *ina lib-bi* 3 NITA₂.MEŠ ⁽¹¹⁾ PAP 465 U₈.UDU.ĪLA ⁽¹²⁾ *gaz-za-a-ti šá* PN, ⁽¹³⁾ IR₃ PN₂:

“Sheep shorn in year 1 (?): 22 rams, 2 *parru* (or *pargallu*), 331 ewes, 10 nannies, 4 female kids (?), in total 369 sheep, 80 lambs, among which 25 male and 16(?) young goats among which 3 males. In total 465 “sheep” of PN, servant of PN₂.”

Though the reading of line 6 is far from certain, the main problem is line 3. Two reconstructions can be considered. The text is dated in month IV and its main concern seems the fact that the sheep have been presented for shearing. The subtotal in line 7 adds three categories of sheep and two of goats. As the total includes all “full grown” animals it is probable that we must read in line 3 *par-[ri]* and not *par[-gal-lu]*, as it is likely that these animals will have been included in the shearing. The young animals in lines 8–10 are included in the second and final total, and though counted among the shorn sheep (line 12) they constitute a separate category of animals, and were possibly not even shorn. The text suggests at any rate that *parru* and *kalūmu* are not completely identical, though the possible reading *pargallu* complicates the matter. BRM I 4 again suggests that there was an intermediate category between the full-grown rams and the male lambs.

3. Herd inspections in Uruk

The Uruk herd inspections are listed in Appendix II. They date from month III in Kandalanu yr. 9 to month III in Cambyses yr. 7, but there is a change in terminology, which may or may not be

significant.

All texts divide both sheep and goats according to gender and age into two groups, eight in total. Up to an unknown date before Nebukadnezar yr. 28 the terminology, excepting that for the ram, is derived from the Sumerian, while from then on it is Akkadian. Subtotals are given for sheep (“whites”) and goats (“blacks”). Occasionally outstanding deliveries in animals and wool or hair are mentioned.

The dates cluster in months III and IV, with V occurring occasionally. The documents are the summing up of the herds after shearing and marking and form the basis of next year’s assessment. In those cases that a later date is mentioned some specific purposes will have been served.

The fact that all breeding rams are called *puhallu* irrespective of age in these texts does not mean that age was of no concern. Joannès TÉBR 60 (14.ii.Ner.2) lists expenditure on a business trip: 4 mina 20 š, or 2 š a piece, is spent on 130 UDU.NITA₂.ME 4.MEŠ 3.MEŠ *u* 2 MEŠ: “rams(?) of 4, 3 or 2 years old”. Such indications are rare, however.⁶⁷

Young male sheep are called BAR.GAL, *pargallu* in the earlier texts, and *ka-lum* in the later group. GC I 252 (13.iii.Nbk.41), is a herd inspection containing additional information about animals withdrawn from the herd. Male lambs retained are called *kalūmu*, but those removed are BAR.GAL.ME. They are subdivided into groups which go to the “internal” herds (lines 16 and 20) for use as offerings (line 7) and a small group which is transferred to another herdsman *a-na* UDU *pu-hal-lu-tu* “to serve as breeding rams”.⁶⁸ The text suggests that there is no difference between *kalūmu* and *pargallu* in Uruk, the same category of animal is meant.⁶⁹ In its turn UDU.BAR.GAL is equated lexically with *parru*, which ostensibly is not found in Uruk texts unless it is the reading of BAR.GAL.⁷⁰

Yet the impression provided by GC I 252 is not in every respect correct.⁷¹ This is demonstrated by YOS 7, 143, again a text dealing with transfer of animals from the external to the internal herds. Of 793 UDU.ME, including goats, delivery is taken from the *nāqidu*’s in month IV and V at shearing time (*ina muḫḫi gizzi*). The relevant passages are ⁽¹⁾ [5 *pu-ḫa*]-lú 35 UDU.BAR.GAL 645 *ka-lum* 2 U₈ 2 MÁŠ.GAL 1[x] *a-na ú-ru-ú*: “[3 ram]s, 35 *parri*, 645 *kalum*, 2 ewes, 2 billies and 1 [?] to the stable”, and ⁽¹⁹⁾ 31 UDU.BAR.GAL 24 *ka-lum* 4 U₈.SAL.MAḫ₂ pap 59 *šá se-e-nu-u* ⁽²⁰⁾ *šá URU Tak-ri-i-te-nu* ..., “31 *parri*, 24 *kalum*, 4 ewes total 59 from the sheep at T....”, cf. also line 17, one *parru* (BAR.GAL) and 101 *kalūmu*, 102 together. *kalūmu* and *parru* do not have the same meaning, a *kalūmu* is a younger animal than a *parru*.⁷² Perhaps we must add: “when used in a strict sense”, for it remains remarkable that up to Nbk.II yr. 1 (GC I 2) herds in month III and IV only contained UDU.BAR.GAL (*parri*) and after Nbk.II yr. 28 (ROMCT II 39, and at any rate yr. 30, GC I 292, if the first named text does not come from Uruk) only *kalūmu*.⁷³

Perhaps texts like GC I 222 and 252 suggest that in Uruk at the *amirtu* in month III and IV what remained and was retained of last year’s BAR.GAL was formally classified as *puhallu*, as these animals were by now over one year old. All new young males of the year itself were called *kalūmu*. I feel that it is unlikely to suppose that in the earlier inspection texts animals of the *kalūmu* stage were not counted at all, and that in the later texts those of BAR.GAL/*parru* stage were counted with the *puhallu*. The texts are interested in the owner’s share and that depended on the year’s crop. It is only to be expected that in actual herding there was a term for young rams of over 6 months old, as they were capable of breeding.⁷⁴ The meaning of *pargallu*/BAR.GAL will perhaps become clear when we understand better when “lambs” were supposed to contribute in the wool yield of the flock.

But there are further complications. YOS 7, 143:7 (Camb.3) 2 *ka-lum ba-ab-ti* 20 UDU.SILA₄.ME *a-na pa-ra-su*¹ šáⁱ sig₄ U₄ 20 KAM: "2 *kalūmu* instalment of the 20 "lambs" for assignment (to various offerings) on 20.iii."⁷⁵ Though SILA₄ can be explained as *kalūmu* according to the lexical section in the dictionaries we must perhaps read *puḫādu*,⁷⁶ a word used only for young male sheep intended for offerings in our period.⁷⁷

There is not much to add to UDU(NITA₂) *ka-lu-mu ḫa-di-ru*.⁷⁸ BIN 2, 112 (31.ix.Nbk.24) and Stigers, JCS 28 no. 4 (26.v.Cyr.3) both stipulate delivery in month XI, but YOS 7, 81 (23.[?].Cyr.9) calls for marking on 1.ii.

Another point of difference between the early and later Uruk herd inspection texts is the terminology for ewes. The later group uses U₈, *lahru*.⁷⁹ The intention is of course that these are animals of proven fertility, as *alittu*, indicates. *alittu* is also used for cows and birds in the Uruk texts. A frequent alternative in the earlier texts is U₈.GAL.⁸⁰ Other terms used by some texts require collation.⁸¹ Still another term for ewes in Uruk is U₈.AMA "mother sheep", which is, perhaps, obvious enough.⁸²

For U₈.SAL.MÁḪ (=AL) the CAD accepts a reading *lahru*.⁸³ The texts quoted, BIN I 174 (27.iv.Nbn.14) and YOS 7, 143 (iv and v.Camb.3) deal with U₈.SAL.MÁḪ which are being removed from the herds. The dates suggest at the *amirtu*. They are sold for silver or barley, or disposed of as food for labour gangs.⁸⁴ This suggests that SAL.MÁḪ means "barren" or "too old for breeding purposes". Cows called ÁB.SAL.MÁḪ are also sold.⁸⁵ The actual reading of the term appears to be unknown.

For the female lambs the early texts use UDU.BAR.SAL and the later the Akkadian equivalent *parratu*, though the earlier writing occasionally remains in use.⁸⁶

Not many tabulated herd surveys or herd accounts dealing with sheep can be identified as coming from Uruk. BIN I 176 (21.v.Nbk.30) and NBC 4897 (28.iii.Ner.[1], R.H. Sack, Festschrift T.B. Jones p. 117–8), use as is to be expected the terminology of the second group. Cf. the additional material in Gehlken 1990.

4. Sippar

The small herd inspection texts from Sippar at present available all date between 5.iii.Nbp.8 and 30.viii.Nbp.20. All published texts but for those from Nbp 20 date from month III. Terminology is uncomplicated and Akkadian: *puḫallu*, *alittu*, *parri* and *parrat*.⁸⁷ These terms are also used in later texts dealing with herds, notably the many tabulated documents, published and unpublished.⁸⁸ The small Sippar herd inspection texts do not give, in general, subtotals for sheep and goats.⁸⁹

CT 55, 596 combines *puḫallu* and *parru* into UDU.NITA₂ *zi-ka-ri*. In Sippar texts UDU.NITA₂ is a neutral word for "sheep": CT 55, 659:1 (22.xii.Nbn.2) UDU.NITA₂ *par-ri*.MEŠ, CT 55, 597 (15.ix.Nbn.10) is similar, CT 55, 625 (16.iii.Cyr.6) has UDU.NITA₂ *ka-lu-me-e*, but Cyr 247 (15.i.Cyr.7) knows of 1-*it* UDU.NITA₂ *par-ra-tum*.⁹⁰

As in Uruk the terminology for young male sheep is more complicated than the herd inspection texts suggest. Pinches, Peek no.3 (10.vii.Nbn.13) is a document concerning the inspection ša *ka-lu-me-e* šá¹⁰ SIPAD.MEŠ ša¹¹ UTU šá *ár-ki e-peš* NÍG.SÍD, "of the *k*. belonging to the herdsmen of Šamaš after the settling of accounts", but the actual animals accounted are classified as *parri* and *parrat*. Lines 13 and 14 indicate that these are not so much lambs present as outstanding.⁹¹ *kalūmu* is used for male and female animals.

kalūmu returns in the summary of Nbn 490 (2.i.Nbn.11). The animals are delivered by herdsmen; ⁽¹⁾ UDU.NITA₂ *šu-kul-tum* ⁽²⁾ šá¹⁶ SIPAD.MEŠ šá *a-na pu-ḫa-de*.MEŠ SÈ-u': "š. sheep handed

in by herdsmen to serve as *p*". This is in month I but the same expression UDU.NITA₂ *šu-kul-tum* in similar context is also found in Cyr 57 (15.vi bis.Cyr.2), six months later, when the animals delivered are listed as UDU.NITA₂ *par-ri*. *šukultu* is translated as "Speisung", "Fütterung".⁹² As delivery is taken in Cyr 57 by Nabû-našir the *sattukku* herdsman the lambs had perhaps been specially fattened up by the external herdsmen. The difference in time between Nbn 490 and Cyr 57 suggests again that *kalūmu* indicates an earlier age group than *parru*.

puḫādu is a word regularly used by administrative documents from Sippar. In Camb 22 (19.xii.Camb.0) herdsmen deliver UDU.NITA₂ *pu-ḫad*.MEŠ. Line 8 [x] *puḫād* 1 *par-ri*, suggests that *puḫādu* is an earlier stage than *parru*, but perhaps the word *puḫādu* rather indicates a purpose than an age group, for in Camb 354 (4.i.Camb.7) and CT 55, 621 (18.viii, yr. 8) we find *kalūme ana puḫādē*.⁹³ These dates are so wide apart that either the idea of a fixed lambing season or the interpretation of *kalūmu* as a not sexually mature young male animal becomes questionable. Perhaps the use of sheep terminology in administrative documents is somewhat "loose". *puḫādu* are probably male sheep (to be) used for offerings.⁹⁴

That *puḫādu* indicates both a purpose and an age group could possibly be inferred from VS 6, 258. In this list of sacrifices for Annunitu from Sippar, where *puḫādē* are contrasted with *pa-ra-su*, in this text clearly weaned "lambs", *puḫādē* would seem to be the older animals. In the tabulated sacrificial lists from Sippar, which, depending on the cultic importance of the date, include cattle, sheep and fowl, the sheep are represented by *pargallu* and SILA₄, cf. e.g. Sollberger RA 74, 1980 p. 59 and several similar texts. Note that in BM 82–3–23, y, Falkner AfO 16 both *pargallu* and *puḫādē* occur.⁹⁵

5. Goats

In Uruk and in Sippar males are MÁŠ.GAL⁹⁶ and MÁŠ.TUR. Females in Uruk are ÛZ and SAL.ÁŠ.GÀR,⁹⁷ and in Sippar ÛZ *a-lit(-tu)* and again SAL.ÁŠ.GÀR.⁹⁸ Four Sippar texts, all dated 29.viii.Nbp.20,⁹⁹ replace MÁŠ.TUR by *ga-du-u* and SAL.ÁŠ.GÀR by *munīqu*. In CT 55, 460, undated and also from Sippar, uses *gadū* (lines 4 and 13) and *unīqu* (lines 5 and 14).¹⁰⁰ The Akkadian words for (full-grown) billies and nannies are apparently not recorded in practical texts. *urīšu*, *daššu* or even *gizzu* are possibilities for MÁŠ, ÛZ seems to be *enzu*. ÛZ.SAL.MÁḪ (=AL) in the Uruk text YOS 7, 143 (lines 10 and 15) will be the barren or over-age nanny that is removed from the herd, cf. the discussion on U₈.SAL.MÁḪ in paragraph 3 of this section.

The discussion of sheep and goat terminology does not suggest that castrated sheep or goats were kept, even though the practise would stand to reason from the point of view of control of the herds, meat production and even wool quality.

VII Herds

a. The growth of a flock: NBC 4897

In the Festschrift T.B. Jones R.H. Sack published a copy of NBC 4897, cf. Appendix IV, a text listing sheep and goats belonging to Belet Uruk and Nannā managed by, though this is not stated explicitly, Nabû-aḫḫē-šullim, son of Nabû-šum-iškun in the years, I presume, from Nbk.36 to Ner.1.¹⁰¹ As Sack stresses no further documentation about the herdsman exists, but he seems to belong to the *nāqidu* class according to the last line of the text. The document illustrates a success story: an increase from in total 137 to 922 animals, a six to sevenfold increase in 12 years, including the first year, with a notable acceleration of the increase throughout the last

years.

For each year the text presents numbers for each of the four categories of sheep and goats known from the “later” group of Uruk herding inspections (cf. Section VI, 3) with subtotals and a grand total. Separate amounts of *KUŠ*.ME and *idi* are given for each category of animals.

The comparison with the contracts in Section III suggests that the *KUŠ* section represents those animals the loss of which is accepted by the flocks’ owner. The losses never exceed the 10% (of the living herd) mentioned in YOS 6, 155 and similar texts from the Aršam group. No parallel can be found in other texts for the yearly number of animals marked as *i-di*, “wages”(?). As the *KUŠ*-numbers represent a reduction on the shepherd’s obligations, the *i-di*, whoever was the beneficiary, similarly represent a decrease in his liabilities, as is clear from calculation, see below.

The treatment of the first year of Awil-Marduk differs somewhat from that of the other years. After the line giving the composition of the herd for that year follows a statement about a total of 104 animal *ina irbi šà* ¹⁰²ŠE MU.SAG.NAM.LUGALLA LÚ-^dMarduk “belonging to the (animals) turned in in Month XII of the accession year of Awil-Marduk”. It cannot be accidental that the animals derived from the *irbu* and the herd registered for yr. 1 together add up to the total for yr. 2. The ordinary deductions for year 1 follow, the animals from the *irbu* therefore represent an increase in the flock provided by the administration.

In addition for each year, excepting the first, the line containing the statement about the composition of the herd also contains a remark about a small number of (UDU) BARGAL *ina gi-iz-zi [ma-hi]-lir* (?) (line 5)?? “*pargallu*’s received at shearing”.¹⁰² These animals, nearly always young male sheep,¹⁰³ represent a final deduction from the number of animals mentioned as the total for that year, before a new account for the next year was opened.

Following the statement about the animals received at shearing comes a remark about amounts of wool. As this statement is written on the damaged right hand edge of the tablet it cannot be reconstructed with certainty in several cases.¹⁰⁴ The same is true of the last four lines of the reverse which contained the outcome and purpose of the text, the two lines on the upper edge only indicating that the tablet belongs to a whole series of similar accounts with other *nāqidu*’s.¹⁰⁵

As an interpretation of these lines is of importance for the understanding of the text I will risk an attempt. Rev. 7–8 list the herd as it was (or should be?) at the inspection of Ner.yr.1, with two subsequent small reductions. Line 8 registers what was present (*am-ru* “seen”) at the next(?) inspection, with in line 9 what is missing compared to lines 6–7.¹⁰⁶ That would mean that the expected increase of the herd is not included in the total. This is understandable enough, as that depended on the total number of ewes with lambs. A further problem is that the amount of wool in rev. 9 (as read) cannot be the produce delivered by the animals listed in that line.¹⁰⁷ As I understand rev. 11, lines 9–10 represent what was outstanding from the new year’s account – probably still without the expected increase and it is therefore not a grand total of all arrears. In my opinion the text is only an interim balance, as the herd of over 900 animals will have been split up into more manageable segments, most of which had not been presented for inspection. Accepted losses (*KUŠ*) and *idi* are not yet stated and young animals seen and not seen add up to the total given for Ner 1. That excludes the inspection for yr. 2, and the “flock”-numbers represent the amount for which the “herdsman” is accountable. But why should an interim document contain the elaborate summing up of earlier evidence? There must be a very specific reason.

The general difficulty is that withdrawals from the herd are not mentioned by the text – or only in exceptional circumstances. The numbers for each year therefore represent the final balance

of the year, it would seem – we must not expect that we can directly relate these to subsequent years.

Though several points remain poorly understood the text gives us information about the size of a single herd in an administrative sense, over a period of 12 years. Though it is not clear whether the composition of the herd reflects a policy, it should be noted that in the *KUŠ* and *idi* sections no *kalūmu*, young males, are allowed, but that for the *puḫal* and *u_g* sections reductions of 10% are accepted. In the female lamb section more than 10% loss is permitted. This would seem to indicate that the owner was especially interested in young male lambs. These are with insignificant exceptions the only animals withdrawn from the herd when slightly older, as BARGAL at the (next) shearing of the flock. If we subtract these *pargallu*, the *puḫallu* in the *KUŠ* and *idi* sections and add the *kalūmu* to the remaining *puḫallu* we reach the number of *puḫallu* for next year’s account. The same year’s *u_g* are reached by adding *u_g* and *parrat* of the year before and subtracting the same two categories in the *KUŠ* and *idi* sections. In theory this allows for the complete recalculation of the mistakes in the text or copy.¹⁰⁸

The number of *kalūmu* mentioned by the text is no indication for the number of lambs produced, as (most) withdrawals by the owners are not stated. Female lambs mentioned in the three sections of the text would together seem a better indication. If the flock produced no more than in total double the number of the female lambs registered, only about 2 out of 3 ewes would have had a lamb per annum. Whether this indicates real productivity or a withdrawal of female lambs from the herd remains undecided, but it possibly reflects the contract between owner and herdsman. Optimistically we might reason that this 2 out of 3 represents the 66% due to the owner according to the contracts, the other one third being the herdsman’s share. Even so an average of about one lamb per ewe is only reached with difficulty though this might be reality, with very little twinning. As is nearly always the case in Uruk herds the goats are of minor importance. The importance of NBC 4897 can hardly be underrated. The text suggests a deliberate build up by the institutional owner of a small flock into a considerable producer of lambs and wool. But the text also seems to suggest that the delivery of wool had fallen into arrears.

b. The Aršam texts

The nine Aršam texts of Appendix I differ from the Uruk and Sippar material in that the young males of both sheep and goats are not counted with the full grown animals. As duly noted already by Augapfel the texts also exhibit the particularity that an equal number of male and female lambs is kept with the herds.¹⁰⁹ Although these herds cannot be followed through a number of years, in every case the number of males of under one year is considerably larger than the number of animals in their second year. This suggest losses or withdrawals of lambs later in the year.

The total of male and female lambs is apparently kept balanced artificially but in combination well below the number of animals we might expect the owner to receive if every ewe had at least one lamb. This indicates, it would seem, that in the Aršam herds not only male, but also female lambs were withdrawn. The ratio of *puḫallu* to *alittu* varies considerably from herd to herd, but the number of males seems more than sufficient. As the herds do not belong to a temple, the high number of male animals cannot be explained as sacrificial in purpose, unless, as is possible, social obligations made the production of animals for sacrifice a necessity.

In BE 10, 130 and PBS 2,1, 148 the goats play a minor role in the herd, but in other herds, especially BE 10, 131 their share is considerable. There is only one herd without goats. In this

group of contracts the owner expects one kid from every (fertile) nanny.

The three earlier Murašû herd texts might indicate a rigorous reduction of young male lambs, which were thereafter allowed to reach their second year, when a further reduction followed. If the number of female lambs kept is an acceptable indicator for total lambing (representing half of the owner's two-third share), all female lambs were kept. The same can probably be said for young goats.

c. Uruk herds

Appendix II contains information about herd sizes derived from Uruk herd inspections and the terminology of the earlier and the later text group. The texts do not contain information about the status of the herdsman, and it remains unknown whether the person concerned is a *rē'û* or a *nāqīdu*. Nearly all herds in Appendix II are too large for a single herdsman. This could suggest that most belonged to *nāqīdu*'s.

The first fact that stands out is that in Uruk goats are relatively unimportant. Only GC II 176 (22.iii.N[bp.]11), LB 1525 (19.iv.Nbp.14), GC II 13 (10.iii.Nbp.19) and especially TCL 12,83 (25.vi.Nbn.5), YOS 6 227 (22.[?].Nbn.10) and YOS 6, 228 (26.v.Nbn.17) contain sizable numbers of goats. Usually the few goats are no more than the traditional lead animal of the herds. Only GC II 10 (29.iii.Nbp.13) specializes in goats.

The other obvious fact is the rigorous reduction of the number of the young males before or at the inspection. Their numbers are way below the female animals of their age group. This obviously reflects the temple's interest in the young rams for sacrificial purposes which involved their transfer to the internal herds. The number of young males retained rarely exceeds the number of full-grown males especially in the earlier group. There is a clear difference in this respect from Sippar.

Female lambs therefore inevitably reflect the total number of young much better. However, if we apply the rule derived from the herding contracts that two-thirds of the crop was the owner's and one third for the herdsman, the outcome is erratic, especially when related to the month to which the text is dated. An explanation could perhaps be found in organizational aspects, e.g. *nāqīdu* herds versus *rē'û* herds, or otherwise in the erratic working of the withdrawal system.¹¹⁰

It should be noted, however, that in only a single case, GC II, 1 (16.iv.Nbp.19) trebling the number of female lambs produces an average of 1,45 lamb per ewe,¹¹¹ otherwise 1,3 is not reached,¹¹² and in general the outcome is well below one lamb per ewe, even under the 66% level. Bad results or withdrawals might be blamed. In a striking number of cases what might be called round numbers are given.

Extremely low outcomes in particular may have special explanations. GC II, 265 (Cyr.7), mentioning the well known *nāqīdu* Nabû-našir s. Laqipu is possibly a receipt rather than an inspection, as the additional remark *ina šā ir-bi* behind the two categories of female sheep indicates. GC II, 26 contains a damaged statement about silver paid for 120 sheep which complicates the situation. GC II, 178 (1.x.<Nbp?>.18) would seem to be the only Uruk inspection text immediately before the (supposed) winter lambing season, a low ratio of lambs to ewes therefore stands to reason. YOS 17, 87 (9.[?].Nbk.[x+6]) is, perhaps, even more uncertain than other texts, but there remain a number of very low yields that cannot be explained away¹¹³ (cf. GC II, 21, 9.v.Nbp.18). Perhaps all results from Nbp. yr.18 were unfavourable.¹¹⁴

All speculation based on the herd inspections is hazardous, however. BIN I 176 (21.v.Nbk.30), one of the few tabulated sheep texts from Uruk to be published, with 215 ewes to

1 male and 10 female lambs and 117 ewes to respectively 5 and 14 might indicate that considerable withdrawals could be made or additional animals supplied, as in YOS 6, 142 (12.ii.Nbn.11) (lines 9–10). There are simply too many uncertain factors. Texts about sheep due from herdsmen often do not specify the category to be provided, this might or might not indicate that male lambs were required.¹¹⁵ There is no evidence which allows us to match the withdrawals from the external herds with the intake of the internal ones.

d. Sippar herds

The number of single-herd texts has grown, and will continue to do so. Much additional information on the flocks can be obtained from the (generally somewhat) later tabulated documents, but as this cannot be done in a systematic fashion now, it must be deferred to later.

With one later and one earlier text, all refer to three inspections: early in month III of Nabopolassar 8, middle of month III year 17, and end of month VIII in year 20.

There are certain terminological differences. The only text from Kandalanu 13, and the texts from 28 and 29.viii.Nbp.20 use the Akkadian terms for both categories of young goats. Of these *unīqu* is only found in the text from Kandalanu yr.13. The texts from Nbp.8 either put *šā*, "of", in front of the name of the herdsman, or mention him without any introductory formula(?) (CT 55, 454 is damaged). The texts from Nbp.17 all say *qa-pu-tú šā* PN. BM 54013 and 53062 have been placed with year 17 for that reason, though 54013 has *qa-pu-ut-ti šā* [PN] and 53062 PAP *qa-pu-tú šā* PN: possibly this could indicate another series. The Nbp yr.20 texts mention the "herdsman" without ado, but for CT 55, 447, which has *šā* PN *ina* IGI PN₂, thus indicating special arrangements. A similar complication is found in BM 49594: *qa-pu-ut-ta-tú šā* ^{pa}UTU-ŠUR *ina* IGI ^{pa}UTU.BA-šā A-šū šā ^{pa}Bu-ne-ne-DÜ ^{pa}AK.NUMUN.DÜ A-šū šā ^{pa}AK.ŠEŠ.MU ù ^{pa}Di-hu-um-mu ^{pa}ENGAR šā ^{pa}UTU *a-ki-i* ^{pa}SIPAD.MEŠ šā ^{pa}UTU *pu-ut na-ši*: "herds of Šamaš-iqīša son of Bunene-ibni, Nabû-zêr-ibni son of Nabû-aḥa-iddina and Diḥummu, the ploughman of Šamaš, in the same way as the shepherds of Šamaš he is responsible". The format of two texts differs slightly from the others: CT 55, 465 and ZA 4 no. 15 combine different categories of animals on one line, the other texts do not. Final totals and subtotals are only given by three texts, and that incompletely. Totals within brackets have been calculated. The texts from 30.viii.20, also using ideograms for the young goat categories, put PAP BABBAR.MEŠ, PAP GI₆.MEŠ behind the sheep and goats, but without numbers.

All texts from Nbp yr. 8 leave out the male lambs, indicating complete removal from the herd of this age group. Numbers indicate a considerable increase in flock size between Nbp.8 and the later years of the reign. In several cases this is supported by texts dealing with what could be the same flock, though some names are very common, e.g. Bunene-ibni. Nabûkilanni's herd is mentioned in CT 55, 448, BM 53062 and CT 55, 447, but of these only the first and the last is useful. There is a clear increase for all categories, especially for the sheep. The herd of Šamaš-balassu-iqbi s. Ammeni, which can be studied through other documents, shows an even bigger increase. But the tendency is not uniform, as the two last documents of Nabû-kilanni may indicate. The herd of Šamaš-eṭer son of Zerija (BM 40794 and 49441) shows a marked decline between Nbk.17 and 20, even more noticeable as the numbers for young goats have disappeared in the earlier text (x's). Ninurta-ilajja's herd (CT 55, 461 and CT 55, 453) shows not only a downward fluctuation between years 17 and 20, but also a shift from sheep to goats. But Nergal-epuṣ s. Nabû-šamsija, CT 55, 450 and 458 is probably representative of the long-term growth in this period. There is much more material which requires detailed study, but the material in the table indicates a policy dedicated to growth. It should be kept in mind that the herds

included in the table are only those found in one type of texts, the existence of more is known.

Goats are much more important in Sippar than in Uruk. Though the owners expected a higher yield in goats than in sheep, the number of young animals in the herd, compared to that of the nannies is low.

e. The many rams

When discussing sheep terminology the reluctant conclusion was that there is no (unambiguous) word for a castrated ram, even though the practise makes eminent sense from several aspects: control of the flock, quality of the meat¹¹⁶ and of the wool.

It is difficult to obtain reliable ethnographic information on the number of ewes per ram that is regarded as a feasible minimum,¹¹⁷ but everything indicates that the number of rams in the Neo-Babylonian texts tends to be relatively high when compared to that of the ewes.¹¹⁸ Certainly so when the fact is taken into account that all males of over the age of six months are supposed to be capable of breeding.

Yet NBC 4897 indicates that the remaining young males of one season all move into the *puhallu* category of the next and we must assume that this is the regular practise in Uruk. In Sippar (Appendix III) a further reduction of the young males is to be expected, and the same seems indicated in the Aršam contracts, where *mār šatti* rams seem to be reduced in number before becoming MU 2-ū's, which are reduced still further before becoming *puhallu*. Until better evidence is forthcoming I regard a *puhallu* without reservation as an uncastrated male. This means that, at any rate administratively no castrated males were kept in the external herds. In the excerpt from Sippar CT 55, 596 (lines 11–12 and 18) *pu-ḫal* and *par-ri* at the disposal of (external) herdsmen are added up in the end as UDU.NITA₂ *zi-ka-ri* ("male (male) sheep"). This could mean that animals were castrated when they were moved from the external herds to the internal ones. It is striking that the term UDU.NITA₂ is not used to indicate full-grown male animals, though it occurs as an element in the terms for younger sheep in Sippar.¹¹⁹ At any rate UDU.NITA₂ has become a word for "sheep" in general.

In the Uruk lists of animals from the internal herds expended daily on offerings¹²⁰ UDU.NITA₂ exchanges with UDU to indicate the sacrificial sheep, and the same with a clear preference for UDU.NITA₂ can be said about other texts dealing with animals in the internal herds. The same is the case in Sippar. The possibility should be considered that UDU.NITA₂ has acquired the meaning "castrated sheep".

The main objection against the idea is what might be called a cultural one. When looking at (Sippar) texts about animals sacrificed to various gods it is clear¹²¹ that a "complete unblemished" animal (GUD *šuk-lu-lu*) is the main sacrifice for the most important gods. The assumption that this animal is not castrated is to all probability correct. Oxen called *tapīru*, "castrated"¹²² are a "second best". If a sacrificial animal has to be "complete", this would form a strong cultural argument against castration. Landsberger seems to speculate (MSL 8/i p. 68) about the possibility that the knowledge of castration may have been lost somehow in the first half of the second millennium BC in Mesopotamia. This is highly unlikely in a society which used oxen as plough-animals. If sacrificial animals had to remain uncastrated that was a conscious decision. If sacrificial cattle are divided in accountancy documents into castrated or not, why not the sheep? The possibility remains that in temple herds sheep remained uncastrated, even when kept for mutton. Otherwise all male sheep in the internal herds were castrated: there is no terminological differentiation.

VIII Products

The contracts discussed in section III explain that the (institutional) owners expected young animals and wool from their herdsmen. The hides and tendons from the ten percent accepted loss per annum should be seen primarily as proofs that the animals had really died, though the overall economic importance of hides is easily underestimated as the documentation on this article is not very rich.

The texts discussed in section VII indicate that especially young male animals were withdrawn from the (external) herds mainly in their first year and to a lesser extent during the second year. This is what is to be expected. These animals were not regarded, in general, as ready for consumption and were first fattened in the internal herds. Older animals, especially ewes (SAL.MĀḪ), were preferably disposed of in other ways, being sold or used as food for labourers. That sheep were occasionally sold for cash by the institutions is certain,¹²³ but their degree of self-sufficiency is difficult to assess, as buying is also attested.

What was done with the goats is not very clear. Their role in the internal herds is marginal, almost as if they are included by mistake in incoming deliveries. They are not used for offerings¹²⁴ and there is no record in support of them being kept for dairy purposes or for their skins, even though the leather would have been of better quality than that provided by sheepskins. Goat hair is also mentioned rarely in the Neo-Babylonian period.

1. The *bīt urê*: fattening

The available texts suggest that the *bīt urê* was primarily the place where in Sippar and Uruk sheep were systematically fattened during a fixed period by consumption of a regularly increased daily ration of barley. The herd(s) under the *rē'û šattukki* were probably pastured, I see no evidence for feeding with barley, though animals went straight from these herds to the sacrifices.¹²⁵ It is possible that the *sattukku* herds were primarily intended to stabilize the imbalance between delivery, mainly after the administrative procedures connected with the shearing and every day requirements.

The working of the *bīt urê*, or rather of its sheep section, the É UDU.NITA₂ is better known in Sippar than in Uruk.¹²⁶ We have already noted (Section IV, paragraph 2c) that on one occasion sheep "entrusted" to certain households were provided with 1 SILA₃ of barley per day during two months (Camb 256, 13.ix.Camb.4).

Two SILA₃ per day is the top rate for sheep in Sippar,¹²⁷ but we do not know whether the animals were regarded as ready for slaughter after the two months indicated. It is striking that the animals came from the *bīt urê*, and that 20 were placed in what is called the É.ŠU.MIN, the *bīt qatê*. According to BM 75790 (unpublished) this was one of the storerooms from which barley used as fodder was supplied in Sippar. There are other indications that in Sippar the sheep receiving the most food were kept separately in what is perhaps an extension of a "general storeroom", where the barley was also kept, the É.GUR₇.MEŠ, *bīt karê*. In Cyr 250 (2.ii.Cyr.7) a number of 32 animals is given. Other texts do not mention a special place for the most intensively fed sheep. Nbn 998 (7.xi.Nbn.16) mentions 30, but there are only 20 in Nbn 841 (18.ii.Nbn.15) and Nbn 915 (30.ix.Nbn.15), whereas CT 55, 481 (yr. 8) reduces the number further to 10. Neither the numbers nor the dates are at present suggestive of any pattern. It is to be expected that sheep of the right quality had to be available at certain dates in the religious calendar and that fattening was attuned to these requirements. It is likely that availability of food also influenced the amount of barley fed. In Nbn 546 (29.viii.Nbn.11) the 10 top-rate sheep

receive together only 18 SILA₃.

When the top category receives 2 SILA₃ per day, the second category, penned, like the third, according to Cyr 250 in the *bīt urē* itself, gets 1 SILA₃ and the third half that amount. These amounts are confirmed by Nbn 841 (18.ii.Nbn.15) with 20 first, 100 second and 200 third rate sheep. The second category is in Cyr 250 like the first called that of the UDU.NITA₂ GAL-ū-tu, but in Nbn 841 and 915 the term (UDU.NITA₂) *tar-den-ni-e* is used. In Nbn 915 (30.ix.Nbn.15) there are two groups rated at half a SILA₃: 90 UDU.NITA₂ (no further qualification) and 130 UDU.NITA₂ šá [x].MU. With the 20 first rate sheep and the 120 second rate this suggests a system in which not only the amount fed but also the time spent in the pens was, as is to be expected, controlled. The round numbers given by these texts suggest that they belong, to a certain degree, to what might be called estimates. Daily withdrawals and deaths are indicated by other texts. We do not know whether all sheep moved through all categories before sacrifice, as the grading used in the *bīt urē* is not found in lists of animals sacrificed.¹²⁸ It is to be expected that the period the sheep occupied the *bīt urē* was kept to a minimum, which means that these sheep were killed when young. The sacrificial lists of animals (from the herd of the *re'ū satukki*) specify *pargallu*'s and SILA₄'s. The text on the distribution of meat in Eanna¹²⁹ indicates that sacrificial animals were shared out among many interested parties,¹³⁰ which means many small portions.

2. Wool

That wool was a major product for the Mesopotamian economy goes without saying. The contracts stipulate 1,5 mina per sheep, presumably of over one year, though custom will have regulated details.

Wool is removed from the sheep by an action called *gazāzu* with an iron *sirpu*, a tool which is regarded by the CAD as "shears, scissors", but, probably with considered caution as a "Schermesser" by the AHW.¹³¹ Plucking, *baqāmu* is not used any more by the texts. Whether cutting or shearing is indicated by the use of the *sirpu*, the use of an iron tool probably meant that a greater amount of the underwool could be taken than previously, and this in turn probably meant that the total yield per sheep had become greater. We have no means of assessing this supposition as there appear to be no texts combining the actual number of sheep "shorn" with the amount of wool obtained. Texts only mention amounts delivered or due but these cannot be unequivocally related to the number of sheep shorn.

Wool was one of the most marketable commodities available. This is best illustrated by texts from Uruk. Eanna used wool regularly as capital, though it sometimes also spent considerable amounts on it.¹³² In YBC 4141¹³³ the administrators of Eanna promise in Babylon that they will "give" (*nadānu*) 80 *biltu* of wool, which at 1,5 mina per sheep is the yield of 3200 sheep, to two persons, at least one of whom was a royal *tamkaru*. I assume that the administrators received silver in Babylon and promised wool in exchange. At a rate of 4 mina of wool for half a shekel of silver 80 *biltu* represent 10 minas of silver.¹³⁴ YBC 3710 (Sack, ZA 77 p. 284, 18.ii.AwM.1) is a comparable transaction in Borsippa: 6 *biltu* of wool or 1,5 mina of silver is spent on reed mats. YBC 4012 (Sack ZA 77 p. 287) seems to list the annulment of a number of transactions in which the temple has been given silver for a future delivery of wool, which has not taken place.

Though it seems clear that for Eanna wool was the most important product of animal husbandry to provide cash, and though wool supplied all ordinary clothing, it is not possible to quantify this importance with the available documentation.

3. Skins

The herdsman had to deliver the skins and a certain amount of sinews for each sheep loss of which would be accepted by the owner of the herd.¹³⁵ Reasons of book-keeping therefore explain why not only sheep or goatskins are specified, but also occasionally whether these come from mature or young animals, or why the sex of the animals is registered.

That the herdsmen delivered hides goes without saying, but YOS 7, 138 (8.v.Camb.3) is remarkable. A *rab būli* is ordered to deliver ⁽⁴⁾.... 1000 KUŠ UDU.NITA₂.MEŠ *šu-kul-lu-tu* ⁽⁵⁾ *ū* KUŠ *ha-li-sa-a-nu bab-ba-nu-tu*: "1000 tanned sheep skins and fine leather *h.*", the *h.* being according to CAD H 43L "leather straps". This would make herdsmen responsible for tanning, which is unlikely. Perhaps some curing with salt is meant.

Unprepared sheep hide is called *šeḥtu*, as McEwan has established.¹³⁶ In Nbn 345 this type of skins is delivered from the store house to someone we know as a leatherworker. *gildu*¹³⁷ is often given out by weight for the preparation of *šindu*,¹³⁸ sometimes also, as counted items by herdsmen.¹³⁹ I cannot establish whether this word is used for sheep and goat skins, but it occurs for hides of cattle.¹⁴⁰

Equally uncertain remains the question whether the special types or qualities of leather called *šallu* and *dušū*¹⁴¹ derived from sheep or goat skins. For finer quality leather one would expect preference for goat or kid skins. This cannot be established firmly, but AnOr 8, 57:3 is suggestive: billy and nanny goats and *šallu* "leather" constitute together the backlogs of one combined account.

A special problem is posed by the writing material used by the *sepiru*, who is supposed to write in Aramaic on skin or parchment. It is perhaps too fanciful to suggest that the functionary who was to make up the account of the *šal-la-a-nu* and *du-še-e* in Ner 55 (lines 6 and 7) was a ¹⁶*se[-pi-ru]*. This was to occur at the gate of an institution called the *bīt mār šarri*. The *mār šarri* of the next reign certainly employed *sepiru*'s.

The information about skins is not copious, though it suggests the existence of a separate nomenclature related to goats and sheep on the one hand and cattle on the other.

Bone and horn are apparently too humble to be mentioned as materials by the texts.

4. Dairy products

The owners seem, in general, to have left dairy products to the herdsmen. Only the Aršam group stipulates 1 SILA₃ of LNU, *ḥimētu*, per 100 ewes and for each a *gubnatu*, a cheese. [For the etymology cf. CAD G p. 118 R]. *ḥimētu* is "ghee" (CAD H p. 189–190; AHW p. 346 ["Butter"]). Neither product is frequent in Neo-Babylonian administrative texts or private archives.

The same can be said about milk, *šizbu*. But this merely means that dairy products were left to the herdsmen. Though AnOr 8, 67 (28.vii.Camb.2) has been connected rightly with the other texts about animals from the Uruk herds delivered at the palace in Abanu, the purpose of AnOr 8, 67 is, probably different. The *rab būli*'s are ordered to provide 100 ewes and 100 nanny goats in milk (*šá šī-zib*) before the middle of month VIII, that is just before the middle of November. This would be at the beginning of the lambing season. Their milk is required,¹⁴² not their meat.

IX Conclusion

There are three main sources of information on Neo-Babylonian sheep and goats, but two of these, the temple archives of Uruk and Sippar are very similar in background. The third group of texts, the contracts about herds belonging to Aršam deal with the private assets of a leading member of society. Information from the private archives of individual townsmen does not contribute much to our understanding. There is no information derived from people who lived from their own herds. The general interpretation is greatly influenced by a number of herding contracts (Section III).

Though the Uruk and Sippar organizations are possibly not running along absolutely parallel lines, we must probably differentiate between "external" and "internal" flocks, with very different purposes. The internal flocks provided sacrificial animals. These were male and derived from the external herds. It would appear that primarily male lambs in their first year were taken, but the possibility remains that a number of yearlings also were transferred. This seems clear in the Aršam texts. NBC 4897 (Appendix IV) seems to indicate that the institutional owners reserved all young male animals not needed in the flock for their own use. The number of full-grown male animals in the external flocks seems, however, much too high for the flocks' need. The use of the word *puhallu* for these animals seems to exclude castration in the external herds. The change to "neutral" UDU.NITA₂ on transfer to the internal herds could suggest castration at this moment, though in the case of cattle bulls seem to be sacrificial animals of a higher order than the castrated oxen. That UDU.NITA₂ means "castrated sheep" has been suggested previously for other periods.

We can assume that sacrificial animals were fattened during a short period and were then killed, their meat being shared out between the various members of the temple staff. This meant consumption in small portions, and indicates restricted possibilities of retrieval. Older animals were disposed of for slaughter or as complete carcasses. This increases the possibility that their bones turn up on excavation.

The other purpose of the external herds was wool production. We do not know whether the 1,5 mina of wool per sheep mentioned by the contracts represents the complete production. It depends on the importance attached to the contracts. They must represent the interest of both owner and entrepreneur. The entrepreneur probably had backing – as in arable agriculture – from the central administration. That he received a share in the two staple products, young animals and wool – whereas the dairy products benefitted up to a degree the actual herdsmen – seems logical. I suppose that a certain amount of wool went to the *nāqidu*'s though they seem in arrear regularly. I assume that the 66 2/3 lambs per 100 ewes stipulated by the contracts suggests a 1:1 yield as a general target, from which a certain amount of loss must be subtracted. The system operates on the presupposition that the herdsman will do his utmost to reduce losses. In the case of NBC 4897 this seems to have worked. Is the *idu* in that text a premium paid by the owner to the (actual) herdsman?

Wool is a very important cash crop; information on hides and leather is restricted and on dairy products it is virtually non-existent.

Some of the published material, notably the tabulated accounts from Sippar, has not been used for this study. More material on the development of individual herds will increase our understanding of aims and policies.

Acknowledgments

H. Bongenaar suggested several improvements and provided welcome opportunities for further discussion. The Arts Faculty of Leiden University and the Netherlands Organisation for Scientific Research (NWO) provided opportunities for studying the rich Sippar material in the BM, respectively in 1990 and 1993, and in 1991–92. These studies have not been finished, but some material could be included here. A number of new texts is included in the Appendices thanks to the liberal policies of the Trustees of the British Museum and the Curator of the Böhl Collection in the NINO in Leiden.

NOTES

- 1 B. Landsberger AfO 10 (1935–36) pp. 152–159, cf. MSL 8/i (1960) especially pp. 55–59 for a revision of the goat terminology.
- 2 The management aspects of Uruk animal husbandry in particular have been the subject of M. San Nicolò's series of articles entitled "Materialien zur Viehwirtschaft in den neubabylonischen Tempeln" I Or NS 17 (1948) pp. 273–293; II 18 (1949) pp. 288–306; III 20 (1951) pp. 129–150; IV 23 (1954) pp. 351–382; V 25 (1956) pp. 24–38. A sixth article which should have contained the conclusions has never been published.
- 3 E. Leichty (and collaborators) (1986–1988).
- 4 On *amirtu* cf. San Nicolò, Or NS 18 (1949) pp. 288–290. The custom is also known from private archives cf. the Murašû texts BE 10, 105, 106 and UMBS 2/i, 118 all dated 10.iii.Dar.II.6.
- 5 cf. VS NF 4, 24 (20.ii.Nbp.8) and 27 (11.iii.Nbp.9).
- 6 In GC II 41 (19.iii.Nbp.10) we find two groups of animals. The first (line 10) is *ina* IGI PN₁. The second (line 21) is *ša* PN₂ *ina* IGI PN₁. The second herd was that entrusted to PN₂, but was actually herded by PN₁. Cases of herdsmen who fled are known, their herds were entrusted to others, e.g. their *rab bāli*. A similar interpretation is suggested for the Sippar text CT 55, 447 (29.viii.Nbp.20): only one group of animals *ša* PN₁ *ina* IGI PN₂.
- 7 Though there is no 100% certainty that these texts refer to the same persons, in CT 55, 461 Ninurta-ilajja has a *qabuttu*, but in 453 he is mentioned without any "introduction". So is Nabû-killanni in CT 55, 457, but his name is preceded by *ša* in CT 55, 461.
- 8 UCP 9/ii, 3 (9.iii.Nbp.10), Durand EHE 411 (30.ii.Nbp.12) (UCP 9/ii, 4, 2.ii.Nbp.21, slightly different purpose) and BIN I 176 (21.v.Nbk.30) indicate that the small "on the spot" documents and the tabulated ledgers were compiled concurrently, the information derived from the small tablets probably being used for the ledgers on which calculations were based.
- 9 Best example, from Uruk: NBC 4897, 28.iii.Ner.[x] copy with comments by R.H. Sack, Festschrift T.B. Jones, AOAT 203 (1979) pp.114ff.; from Sippar the unpublished fragment BM 50010 is indicative of the existence of the same type of document.
- 10 Yet a text like CT 55, 595, a summary dealing with several years (11 and 12 being mentioned), is of considerable importance for the understanding of the organization of ("external", cf. section IV) herding in Sippar, especially as it can be related to the tabulated ledgers.
- 11 cf. OECT I Pl. 20 f, restudied by McEwan, *Iraq* 45 (1983), pp.187–198.
- 12 On types of modern herding contracts cf. E. Wirth (1971), p. 264. Especially the social consequences of different types of contract are of interest.
- 13 Cf. Appendix I. The texts have been treated often from Augapfel, 1917, pp. 82ff., esp. p. 85, onwards.
- 14 BE 10, 132:14 and BE 9, 1:9 seem to use *tam-lit-tu*, whereas UMBS 2/i, 148:7 uses *mi-il-du*, as do 145 and 146. The interpretation *talittu*, "progeny" is therefore certain, the number of males and females is not specified. Either it is a matter of custom or the herd is kept for purposes which make the gender of the animals less important.

- 15 Sing. would be *muttu*, but note BE 10, 131:19–20 1-en mu-ut-ta-tum (BE 10, 130:20: 1-it mu-ut-ta-ti) BE 9, 1:24 uses *mi-qit-tú*.
- 16 S. von Bolla, 1940, pp. 125 ff.
- 17 In YOS 17, 115 (5.ix.Nbk.5[+?]), obv. we find what seem to be estimates about wool yields based on round numbers of sheep; per *šenu* (sex undetermined) the presumed yield is 1,5 mina.
- 18 Note that VS NF 4, 59:7 (Nbk.34?) mentions 5 MA.NA 1/3 (=20 š) GÍN šfG.ÜZ: 320 š is the yield of 8 goats if each provides 2/3 of a mina, 40 š, i.e. this is less than what is stipulated by the contracts.
- 19 Does this stipulation of two female to one male lamb indicate that “custom” requires this ratio in all (Uruk) deliveries? Note also the ratio 1:20 between full grown males and females.
- 20 cf., from Uruk TCL 12, 18; AnOr 8, 15; An Or 8, 56; YOS 7, 130; YOS 7, 164.
- 21 The Uruk embezzlement trial against the well-known Gimillu, YOS 7, 7, registers (iii.117-iv.134) the case of the corrupt *nāqidu* Šamaš-aḫa-iddina s. Nabû-šum-ukin and his son Šilla, who allegedly had not been seen with their sheep for 10 years. Not only the (small) herdsmen had their problems, the owners also had their share.
- 22 S. von Bolla 1940, pp. 131–3.
- 23 I take the *ana* 1/2 MA.NA 2 GÍN K[Ü.BABBAR] of line 5 as a specification of the *ana zitti* which it follows. I see no reason why the owner should give the herdsmen a loan/payment of 32 š as von Bolla’s translation seems to suggest. The share seems to have a fixed value, but presumably the amount varies as it is paid in wool and lambs.
- 24 A similar double organization can of course be postulated for other great organizations, notably royal palaces or holdings of great noblemen (e.g. Aršam), but there is no documentation.
- 25 cf. Section II.
- 26 H.M. Kümmel 1979 esp. pp. 48–91. Our understanding of the relation between “internal” and “external” herding will greatly increase when the texts studied by E. Gehlken, Heidelberg, become available.
- 27 Only Inanna-šum-ereš s. Nabû-epuš (line 26) with 684 animals comes in the same bracket. As the heading of the text is lost the purpose is not clear. There is no relationship between the amount of wool and goat-hair mentioned and the number of *šenu* in column I. This suggests that the text lists amounts still due (or possibly paid already), but not totals due, as in YOS 7, 39 (18.v.Cyr.4) cf. San Nicolò Or NS 23 (1954) pp. 363–6, dealing with backlogs (*rehānu*) in *šenu*, wool and goat-hair of the *nāqidu*’s and (the *rab-būli*) Ibni-Inanna. YOS 7, 83:35 mentions the amount due from Arad-Bêl (s. Šar-ukin), 156 sheep, but that in itself does not strictly indicate that his herds were smaller than those of the sons of Laqipu.
- 28 Kümmel 1979 pp. 48f.
- 29 cf. M. San Nicolò Or NS 17 (1948) pp. 279–284.
- 30 On 17.ix.Cyr.5 their backlogs amounted to 1807 sheep and goats, 46 *biltu* 56 1/2 mina of wool and 4 *biltu* 18 mina of goat-hair. These last amounts represent a herd of at least 2700 heads. YOS 7, 87 (reign of Cyrus) marks 2174 sheep, 49 *biltu* 53 mina of wool and 2 *biltu* 3 1/3 mina of goat-hair against the names of Iqīša and Zerija. This represents a herd of at least 3261 animals.
- 31 A further argument that the *nāqidu* in Uruk is not an actual herdsman is supplied by Kümmel on p. 68. It regards Nabû-mušetiq-udda s. Nabû-šum-iddin. In YOS 6, 40 (23.vi.Nbn.3), one of the lease contracts treated in Vol. 5 of the *Bulletin* (BSA 5, 236) he occurs in lines 14–15 as the leaseholder whose rights should not be infringed by the new lease. In YOS 6, 221 (7.xii.Nbn.16):3 (and 13) a slave girl who had belonged to Nabû-mušetiq-udda and who had been sold by his son Innin-lipi-ušur is to be transferred to Eanna on account of the backlogs in sheep and oxen incurred by Nabû-mušetiq-udda. We must assume that he had died by this time. Sheep and oxen are not herded together. The texts suggest that Nabû-mušetiq-udda was active in both arable farming and in sheep and cattle breeding. This suggests that he was an entrepreneur on an if not considerable, at any rate wide scale. This *nāqidu* was not a simple herdsman.

A further case, complicated as Kümmel p. 74 states by differences in the date of the documents which could suggest two different persons with the same name, could be that of Silim-Bêl s. Aplā. In addition to a complicated question of status UCP 9/i no. 36 not only refers to backlogs in sheep and cattle, but also in barley and dates. That people with *širku* status participated at a “managerial” level in the economic activities of the temple is not exceptional; we need only recall the role of

Gimillu in Uruk.

In Or NS 17 (1948, p. 291) San Nicolò rejects the *nāqidu*’s rôle as an entrepreneur. It is clear, however, that even though hardly any relevant contracts have been preserved, he was responsible with his private fortune for what remained outstanding. The same is true for the *rē’û*. Employee and entrepreneur blend in a subtle manner in animal husbandry.

- 32 cf. von Bolla 1940 pp. 157–8, Lanz 1976, p. 89 and notes 23, 575 and 980.
- 33 cf. YOS 6, 151:4 Mukkea s. Marduk.
- 34 cf. An Or 8, 28 (25.iv.Nbn.12). Lanz 1976 p. 89 supposes that there is a direct connection with TCL 12, 119, but this is not certain. The document mentions a debt consisting of *šenu*, increase and wool yield, but this remains unspecified. Nabû-šum-ibni is not mentioned.
- 35 Yet a document like CT 55, 72 (datable to the second year of Cyrus on prosopographical grounds) indicates that also in the Sippar livestock organization, farming out of assets was not unknown: 5 MUŠEN.DÛ’s (*ušandu*’s) are “given” (line 11) to an individual promising a yearly quota of birds (called *iškaru*). Similar arrangements in sheep-breeding would be a possibility. In the Uruk text TCL 13, 132 (18.v.Cyr.4) we find a ¹⁰NA.GADA.GIŠ.GAR ⁴PA whose animals are fittingly marked with the spade and stylus of Nabû. The text does not inform us about the status of the herdsman and GIŠ.GAR is not repeated in the related document TCL 13, 133. But the passage suggests that there were *nāqidu*’s who undertook the exploitation of herds against fixed “payments” to the owner.
- 36 Cf. CT 55, 497 (^{ur}Du-bu-x); CT 55, 504 (on the Tigris); Camb 437 cf. Camb 107 (at Gilušu).
- 37 A number of tabulated documents about sheep from Sippar carry two columns towards the right edge which were reserved for the *šibtu*, which was, as far as can be seen in these documents, levied in the form of male animals (goats and sheep).
- 38 cf. VS 6, 76; CT 55, 613; 642; Nbn 1054; CT 56, 390; Camb 248; CT 57, 215(?).
- 39 RGTC 8 (1985) p. 263.
- 40 Undiscussed remains the presence of a tax-collector of the king of Babylon so far to the North in this period: is the Nisibin area really possible?
- 41 cf. TÉBR 44 (AO 19926); YOS 6, 151; TCL 13, 140.
- 42 cf. CT 55, 69.
- 43 Kümmel 1979 pp. 84–6.
- 44 cf. Kümmel 1979 p. 52: much more information can be expected from the texts to be published by E. Gehlken, cf. YOS 17, 362:16 barley for a *mušakil alpi*; clearer is YOS 6, 229:7 (*kurummatu* for ¹⁰ERIM₂MEŠ šá É.GUD, 13 (šá ¹⁰SIPAD.MEŠ šá UDU.NITA₂ ŠÁ.DUG₄) and 51 (¹⁰mu-šá-kil MUŠEN.ĪLA). In YOS 7, 16 (Cyr.1) line 4 looks somewhat like a pro-memori entry: (unspecified) SUG.ĪLA ultu ¹⁰KIN ina IGI ¹⁰ERIM₂MEŠ šá É.GUD u É UDU.NITA₂; “rations from month VI at the disposition of the personnel of the cattle and sheep pens”. In AnOr 8, 36 (18.ix.Nbn.11) only the fatteners of fowls (line 21) are amongst the *ummānu*.
- 45 TCL 12, 123 lists the incoming “capital” in cattle, sheep (goats are not mentioned explicitly) and fowl, and registers the destination given to these animals. What is consumed is indicated by terms like (*ana*) AMARXŠE LUGAL *a-na* É.AN.NA (“for the royal offerings for Eanna”), *a-na* É.AN.NA SÈ-na (“given to Eanna”) or *a-na* É.AN.NA *par-su* (“shared out to Eanna”). The verb *parāsu* is in this and similar texts, also in Sippar, the technical administrative term for the division of the animals into various different offerings to several gods or for other purposes. It is not a stockbreeding term. All animals with this type of remark are expended.

This is not the case with animals with the remark *ana* (É) *urê* “to the stable”. These were kept for future use.

It is a point of difference between Uruk and Sippar that in Uruk dead animals (TCL 13, 123: 19 and 23) are “given to the temple” and consumed there, and not, as in Sippar, salted and sold or disposed of through “the stable”, but through “the storeroom”. This habit is amply illustrated by the monthly lists from Uruk dated between month ix.Nbn.13 (YOS 6, 226) and iii.Camb.6 (TCL 13, 176) listing sheep provided (*parsu*) by the *bīt urū* and the *rē’û sattukki* for *sattukku* and *guququ* offerings. In their completest form these texts present four columns (YOS 1, 50), twice for live animals and for carcasses from both institutions.

- There are many texts in which dead animals, often without indication of origin are at the disposal of *rē'û sattukki*'s. They are rarely sold, it seems (UCP 9/i, 40), but exchange for commodities occurs.
- 46 The word *irbu* is, however, neutral as to the nature of the income, it is simply "that what comes in". In *irbu* texts dealing with animal *irbu* only, female animals occur regularly. Mixed groups of sheep and goats, male and female are often placed *ina* IGI PN, "at the disposal of PN". We must assume that these people were (external) herdsman and that the animals were added to those registered as belonging to their herd, cf. YOS 17, 79 (27.viii.Nbk.18), 83 (25.xii.Nbk.18), EHE 442 (20.viii.yr.20), GC I 302 (23.iv.Nbn.11); three *rab būli*'s. Male sheep go to the *bū urê*, cf. YOS 17, 321 (6.xii.Nbn.6), GC II 88 (9.xii.AwM.0).
- 47 Kummel 1979 pp. 84–6 explains that there was more than one *rē'û sattukki* at a time.
- 48 Goats with the *rē'û sattukki*: BIN 1 148 (29.ix.Nbk.22). Exceptional is YOS 17, 89 (26.ix.Nbk.16) which assigns a few goats to the *paššurû*, an institution of which the nature is not clear, perhaps, as the following passage, mentioning *qêpu* and *šatammu*, is broken. Goats are used *a-na ħi-it-pu ina É.GUD.MEŠ u UDU.NITA₂.MEŠ*. The nature of this type of slaughter is not clear to me.
- 49 Not many texts have been published indicating that Eanna bought sheep. R. Sack JCS 24 (1972) p. 106, UNC 17 (22.i.Nbn.3) is a clear case, cf. also AO 19928 (TÉBR no. 60) and Michigan no. 83. A sale of 95 ewes is registered in BIN 1, 174 (27.iv.Nbn.14); cf. BIN 1,74 lines 8–9.
- 50 Prosopography of Sippar *rē'û sattukki*'s: Nbp.5 (CT 56, 435) to (20.iii).Nbp.16 (ZA 4, p. 142 no. 13): Šamaš-našir; (12.xi).Nbk.1 (Nbk 20) to (23.xi).Nbk.31 (CT 56, 380) Laqipu; (x.xii).Nbk.33 (BM 63860) to (10.i).Nbn.3 (CT 56, 419): Nabû-šum-iškun; (19.xii).Nbn.4 (CT 55, 600) to (30.v).Cyr.2 (Cyr 18): Šamaš-zêr-ušabši and ^{PA}UTU-BAD-A; (15.vi bis).Cyr.2 (Cyr 57) to (19.xii).Camb.0: Nabû-našir; (15.x).Camb.6 (CT 55, 614) to (13.x.Dar.)11 (Nbn 561): Šuzubu; (25.ii).Dar.27 (CT 55, 505) to (x.i).Dar.29 (BM 75021): Širiktum. (Thanks to H. Bongenaar).
- 51 The É.ANŠE.KUR.RA found in Sippar had, perhaps, a different purpose, as there is no indication that horses were slaughtered as offerings to the gods. The horses will have been those of the god's chariot.
- 52 VS NF 4, 55 is distinctly different. Cf. possibly YOS 17, 77 (5.vi.Nbk.22), uncertain. If Moore, Michigan 16 (18.v.Nbk.22) is really from Uruk it is possibly a good example.
- 53 But the reason for the inspection of Sippar herds in viii.Nbp.20 (cf. Appendix III) is less easily understood.
- 54 e.g. CT 55, 662.
- 55 YOS 17, 82 (10.xii.Nbk.14) is remarkable in that it stresses that out of 34 ewes received by the *rē'û sattukki* 8 are *U₈ ga-az-ze-e-ti*, "shorn".
- 56 Cf. also GC I 183 (8.2.Nbk.39): beer for the ¹⁶*ga-zi-ze-e*.
- 57 At 1,5 mina per sheep 50 *biltu* represent 2000 sheep; 5 mina of wool is sold for 1 š. Cf. Section VIII.
- 58 Cf. Wirth 1971 p. 263.
- 59 Both the Uruk and the Sippar temples probably kept herds in the Jezira. So did to all probability Neriglissar if we understand the evidence from the Egibi archive in the right way. It is possible that the Aršam herds also stayed in the Jezira.
- 60 On the indiscriminate use of UDU.NITA₂ cf. the paragraph on Sippar.
- 61 cf. CAD G pp. 126–7, *gukallu*, AHW p. 500 *k/gukkallu*; AHW pp. 838/9 *pasillu* (if a real breed); CAD S pp. 371–2 *sulumhulsuluhhu*, cf. Landsberger AfO 10 p. 152. These terms are not used in NB texts dealing with animal husbandry.
- 62 *šenu* usually includes both sheep and goats, which might weaken the interpretation of *pu-qud-di-tum* as indicating a special breed of sheep. Von Soden AHW p. 880 L emends into *pu-qud-di*, "entrusted", which could indicate a known administrative status cf. Section IV, but I doubt whether the emendation is a necessity.
- 63 cf. perhaps the fragment Durand EHE 466 (?.?.Cyr.9) mentioning *akkadītu* wool.
- 64 cf. already Landsberger AfO 10, p. 154.
- 65 I dispense with a list of graphic variants as they do not contribute to the discussion.

- 66 cf. Section II, the name of the month in BE 10, 132 causes problems. Clay, BE 10 p. 84 suggests month II. The sign could be SIG for SIG₄? That would date this document from Darius II yr. 13 earlier in the year than the others. The reading remains dubious.
- 67 Note that in line 5 56 UDU.NITA₂ cost 4 mina 18 1/2 š or over 4.6 š each; cf. also GC I 330 (17.iii.Nbn.9) 10 UDU.NITA₂ 3-i.MEŠ 4-i.MEŠ, for 33 š.
- 68 The text is not completely without problems or mistakes. In line 4 read *par-rai*¹. In lines 16–20 one of the numbers given is 10 too low as a total of 104 male lambs is withdrawn. Note that Nabû-ahhe-šullim s. Nabû-damiq (line 13) is probably identical with the ¹⁰GAL.⁶¹⁸APIN in TCL 12, 61:3. This herd of 2617 sheep and goats was managed by an entrepreneur with manifold interests. People called *rab epinni* also seem to have belonged to this group.
- 69 GC I 222 (28.iii.Nbk.30, damaged) another herd inspection, uses *ka-lum* when counting the animals in the herd, and it would seem both *ka-lum* and BAR.GAL in the disposition section, which is too incomplete for interpretation.
- 70 Cf. AHW p. 834 L, *parru* is of course the male equivalent of *parrat(u)*, the term used in the later Uruk herd inspections for earlier UDU.BAR.SAL. For a possible occurrence of *parru* in Uruk cf. YOS 17, 81 (29.iv.Nbk.13).
- 71 That a *kalūmu* could be a suckling (male) lamb is suggested by An Or 8, 35:4 where a *U₈* and a *parrat* are transferred together with a *ka-lum*. Between the lines the remark *šā šī-zib* is added. This will refer to the ewe, as "in milk" is said of mothers and not of their offspring, cf. An Or 8, 67:4, but the *parrat* and the *kalum* are, no doubt, her young.
- 72 Cf. also TCL 13, 171 (23.vi.Camb.5) deliveries of UDU.BAR.GAL (36) and *kalūmu* (217) by *nāqidu*'s. GC I 7 (8.i.Nbk.3) contrasts UDU.BAR.GAL and SILA₄.
- 73 A sign of uncertainty can, perhaps, be found in VS NF 4, 25 (20.ii.Nbp.19): UDU.TUR; *kalūmu* is used as an age indicator in the damaged text UCP 9/ii no. 1:8 (Kand.yr. 21).
- 74 Landsberger, AfO 10 p. 155 has rightly stated that *parru* indicates "die Stufe zwischen *kalūmu* und *puhallu*" but perhaps we must somewhat modify his idea that *parru* indicates the male animal of between 1 and 2 years though that is supported by the terminology of the Aršam texts, which have a separate category of UDU.NITA₂ MU 2-u: "Male animal of the previous lambing reaching maturity".
- 75 The text adds another qualification: x ŠA MU. I cannot identify x with certainty. EBUR?
- 76 AHW p. 875.
- 77 Exceptional is also UCP 9/ii, 40 (date lost) 'Rev. 35' gives [x+] 100 UDU *pu-ħa-la* 11 SILA₄.MEŠ as the male sheep in a certain flock (cf. perhaps as line 31, damaged for another flock). Otherwise the text uses UDU.BAR.GAL for young rams (lines 4, and 14) as in the earlier group of herd inspections. The purpose of this text is not clear as lines 10, 20 and "30" which could indicate withdrawals from herds listed, are damaged. Though better evidence would be desirable, it may not be entirely excluded that at the same moment of the year different herds belonging to one organization contained young animals in a different stage of development. This would, however, undermine the idea of a single lambing season. The two herds containing SILA₄ are grouped together in one section of the text, one contains only sheep, the other also has some nannies.
- 78 Cf. CAD H p. 23; AHW p. 307 L.
- 79 CAD L pp. 42–4, AHW p. 528 L.
- 80 In chronological order: VS NF 4, 27; GC II 26, 31, 178, 42, 21, 13; VS NF 4, 26; GC II 1; I 2 cf. I 197.
- 81 *U₈.AB.GAL* in UCP 9/i no. 5 is accepted as a writing for *lahru* by CAD Z pp. 44 L, but the apparent *U₈.AB.LU.TE* (?) in UCP 9/i no. 6 (same date!) and no. 96 (date lost) need checking. Some pun or mix up through *littu* with *alittu* would seem possible. UCP 9/ii no. 3:9 *U₈.UDU AB-tu* (!?) could suggest copying from a transliteration.
- 82 An Or 8, 5:1 (27.iv.Nbk.17) and UCP 9/i no. 28:3 (20.viii.Nbk.16). If the term means "in lamb" the date of the first text does not fit the idea of one lambing season. The herdsman certainly would have a word for a ewe in lamb.
- 83 L p. 44 L.
- 84 Cf. also GC I 65 (6.viii.Nbk.36): sold; YOS 6, 58 (Nbn.1) sold; BIN I 135 (17.xii.Nbn.1) sold; GC I 416 (7.viii.Nbn.5) sold; I 310 (12.vi.Nbn.7) received; GC I 272 (28.xii.Nbn.7) sold; YOS 17, 91

- (1.viii.Nbk.16) sold (?); JCS 31 p. 146 no.21 (17.viii.Ner.2) sold.
- 85 Cf. BIN 1, 108; 144; GC I 164 and YOS 6, 58.
- 86 GC I 301 (9.v.Nbn.8) and YOS 6, 68 (3.vi.Nbn.10); BAR.SAL.
- 87 *alittu* without addition (e.g. of U₈) is used for ewes, *ūz alittu* stands for nannies.
- 88 At this stage I will not include the tabulated documents in this study. Much more work on the texts must be done.
- 89 ZA 4 no. 15 (17.iii.Nbp.17) is of a slightly different format.
- 90 It is given *a-na pa-ga-li(?)* to Zerutu of the *bū urē*. I do not understand this phrase. Cf. AHW p. 809 *paggallu*? Cf. also the UDU.NITA₂ MĀŠ of Cyr 57:13. The dead animals turned in in Sippar at the É.GUR₇ are invariably called UDU.NITA₂. Most come from the *rē'ū sattukki* and the *bū urē*.
- 91 Due are 217 *parri* and 342 *parrat*. This suggests that arrangements about the gender of lambs due to the owners of the herds existed, but these are not specified in the contracts of section V.
- 92 AHW p.1265 R. The word also occurs in the unpublished text BM 67316 (lines 5, 12 and 19) where numbers of sheep are qualified as *šū-kul-tū*, followed by numbers at the disposal of (*ina* IGI) PN_s. Cf. also Nbn 948:7. PN_s in BM 67316 suggest that the animals are in the fattening shed – but, in that case, why do not all animals belong to this category?
- 93 But note that CT 55–621:4 mentions both UDU.NITA₂ *kalūmu* and UDU.NITA₂ *pu-ḫal*.
- 94 But cf. UET 4, 140: 4–6: 1-*en par-ru(!)* PN₁-PN₃ (7) 1-*en pu-ḫa-du* PN₄. Only a few texts from Ur dealing with sheep dated to the Neo-Babylonian period have been published. UET 4, 140 seems to list cattle and sheep. These were probably presented to an institution by the individuals listed. The, in this period largely marginal, area of Ur would be very suitable for sheep breeding, but only very little material from the local administration has been recovered.
- 95 In Sippar SILA₄ are available for offerings in months ii (Moldenke II 12; RA 74 (1980 p. 59 Chester Beatty 127); Nbn 699 etc.); iii (VS 6, 32); viii (VS 6, 29 and YOS 17, 313); xi (VS 6, 19) and xii (CT 44, 71). Whether this is sufficient for the suggestion that as SILA₄ (in the technical sense of the offering texts) were available “during the whole year”, SILA₄ in these texts are animals of up to one year old is dubious. Month viii in Nbk.3 (YOS 17, 313) started early in November and 19.viii.Nbk.8 (VS 6, 29) is November 25th. The new crop could be available by that time. On the other hand VS 6, 258 could be mentioned, as it attests to the availability of *puḫādē* on 17.vi (line 5) 8.vii (9), 19.viii (13). If *puḫadu* is identical with SILA₄ this could decide the matter – if there is only one (main) lambing season. I suppose that *puḫādē* are slightly older than SILA₄.
- 96 I will not discuss the proper (Sumerian) reading of the terms for goats, as this question, no doubt, will be discussed by others. In CT 55, 497:3 (6.iii.Nbk.[x]) we find *pu-ḫal* MĀŠ.
- 97 An occasional MĀŠ in front of SAL.ĀŠ.GĀR: JCS 36 13 and 14. ŪZ.GAL occurs in UCP 9/i no. 5 and 6. MĀŠ.ŪZ in YOS 6, 227 may be a mistake.
- 98 *alittu* is left out sometimes e.g. CT 55, 452 (30.viii.Nbp.20) and Camb 405 (a tabulated text).
- 99 CT 55, 447; 453; 457 and 458.
- 100 Camb 327:3 date lost, from Sippar, seems to replace MĀŠ.TUR by MĀŠ.A.MU.
- 101 A new edition of the text will be published by K.R. Nemet-Nejat and the author of this contribution in a forthcoming number of JCS.
- 102 Not for Awil-Marduk yr. 2; for Ner. yr.1 we have 8 [BAR].GAL *ina* UNUG^{ki} *ma-ḫi-ir* 3 BAR.GAL *ina gi-iz-zi!* “8 in Uruk, 3 at shearing”. *ina gizzi* is regularly replaced by *ina* KLIMIN. For Nbk.40 we have 6 UDU.BAR.GAL 1 [MĀŠ] [GAL] (?) and for Nbk.41: 1 UDU.BAR.GAL 1 U₈.
- 103 Cf. Section V, 3. These animals are no doubt the lambs of the year mentioned in the same line, and not the new lambs appearing first under the next year.
- 104 For Nbk yr. 37 1 <GUN> 20 1/2 mina seems listed; at 1 1/2 mina per animal that represents 53 2/3 animals, thus suggesting that the wool mentioned is the amount that is still due. This seems confirmed by statements for other years for which calculations can be made. For AwM.1 8 <GUN> 43 1/2 (?) mina wool and 8 2/3 mina of goat-hair (read ŠIG.MĀŠ?) seem listed, otherwise all goat-hair due was delivered or not differentiated from (sheep) wool in the account. After Awil-Marduk yr. 1 differentiation is the rule.
- 105 An attempt: ^{Rev. (8)} *ina* ŠA 5 <pu-ḫal> 1 me 38 <U₈.ME> 14 <ka-lum> 41 <par-rat> PAP 1 me 98 <BABBAR-ti> (0 <MĀŠ.GAL>) (8<ŪZ>) ([1]<MĀŠ.TUR>) 1(?)<SAL.ĀŠ.GĀR> PAP 10 PAP-ma 2 me 8

MU.1.KĀM *am-ru* 17 GUN (?) 5 MA ŠIG.ĪLA *m[ah-ru]* ⁽⁹⁾ *re-ḫi* 1 me 93 (?) <pu-ḫal> 3 me 15 <U₈.ME> 66 <ka-lum> 1 me 5 <par-rat> PAP 6 me 79 <BABBAR-ti> 7!<MĀŠ.GAL> 10 <ŪZ> 3[+] <MĀŠ.TUR> 4(?) <SAL.ĀŠ.GĀR> PAP 24 PAP-ma 7 me 3 *še-en* 58 <GUN> 36 1/2 MA ŠIG.ĪLA ⁽¹⁰⁾ 40 5/6 MA ŠIG ŪZ.TA MU 37 KĀM ⁴AK-NÍG.[DU-ŠEŠ LUGAL] [E]^{ki} *a-di* MU.1.KĀM ⁴U.GURLUGAL-ŠEŠ LUGAL.TIN.TIR^{ki} ⁽¹¹⁾ *ša la re-ḫa-[nu]* [x x x x]. The date on the lower edge seems to be 28.iii.Ner.[1?], according to the new copy, cf. note 108.

- 106 Add the numbers for each category in lines rev. 8 and 9: 5 + 193 = 198; 138 + 315 = 453; 14 + 66 = 80; 41 + 105 = 146; 198 + 679 = 877; 0 + 8! = 8; 8 + 10 = 18; 1 + 3 = 4; 1 + 2 = 3; 208 + 703 = 911. These are, with some manipulation, the numbers in line rev. 6–7. There is a difference of 11 among the *pu-ḫal*, which is reflected in the total for sheep and in the grand total, but these missing 11 can be obtained by supposing that the damaged number for the delivery in Uruk in line 7 was 8. This, incidentally, suggests that *pargallu*'s were counted with the *puḫallu*.
- 107 Wool in rev 8: 17 (?) GUN 5 mina + rev. 9: 58 GUN 36 1/2 mina = 75 GUN 41 1/2 mina or at 1,5 mina per head 3027 2/3 sheep. Possibly the amount mentioned represents what remains outstanding over the whole period, but that is unlikely in view of rev. 11.
- 108 The new copy by K.R. Nemet-Nejat solves nearly all problems, cf. note 101.
- 109 A similar tendency with the goats is less pronounced. In BE 10, 130 and 131 there are markedly less male than female kids.

The reading of the numbers in the Murašû texts, as always, causes some problems, as is evident from the tables in Augapfel 1917 p. 85 and P. Briant JESHO 22 (1979) p. 140. Calculations are not always correct. A typical example is BE 9, 1 (28.vii.Art.II.1): Grand total is 1333, subtotals given in this text are 1097 and 238. This last number corresponds to the other numbers for goats, but in combination with 238 1097 does not fit the grand total, it is 2 too many. Reading 1095 would fit, provided Clay's note (BE 9 Pl. 1) on the number of female lambs is accepted, and we suppose that something similar, but not observed is the case with the male lambs, which would mean that we have both 162 male and female lambs, which would bring the total to 1095. The old observation that the numbers of male and female lambs match in these texts supports the reading. But what are we to make of PBS 2/i, 148? Grand total 276, goats 4, sheep therefore 272. This is reached by reading the damaged number for male lambs as 40 and reducing that for female lambs to the same number. But it would accord better with the traces visible to read the damaged number as 50 and to keep the female lambs at 50. The result would be too many for the grand total. In this way the policy of keeping the number of male and female lambs equal confirms itself. Can we apply it to PBS 2/i, 146? Grand total 469, numbers for male lambs and nanny goats lost. 41 female lambs suggest 41 male lambs, the result would be 56 nanny goats. This example shows how far a recognized policy can influence the reading of the numbers from which its recognition is derived.

- 110 The uncertainty of many readings should be stressed again. YOS 6, 128 (16.iv.Nbn.15) must be eliminated – or not included on account of a different counting system – as it is unlikely that 42 ewes could ever produce 180 lambs in one lambing season.

A number of these texts contains additional remarks, in general about sheep and wool (GC I 222; TCL 12, 54; GC I 252) due from the herdsman. In nearly all cases the unspecified term UDU is used: x *ina* IGI-šū or x UDU *pu-ut* (*ina* IGI-šū), which probably means the same. The equally unspecified *še-en* is used in TCL 12, 54. It is not clear whether these sheep are included or not in the number of animals given for the herd. Included are probably sheep derived from the *irbu* and added to the herd: UCP 9/i no. 5 (*a-di* 24 *ir-ba*) and LB 1537 EN 114 *ir-bi?* *ša* MU.17.KĀM (text dated to yr. 18).

That most of these passages deal with backlogs is indicated by ROMCT 2, 39: *ša la re-ḫa-nu ša ina* IGI-šū, “excepting what is still due from him”, cf. TCL 12, 54 and also OECT 10, 107 (*ul re-ḫi(?)*). GC II 33 is not completely readable but mentions UDU.NITA₂ and UDU.BAR.SAL, VS NF 4, 25 possibly SILA₄ and GC II, 1 UDU.BAR.GAL. The use of these last two terms indicates intended transfer to the internal herds. Cf. GC I 252, addition incorrect, where a transfer is specified. Cf. GC I 400, Moore Michigan 41 and YOS 7, 193. These last three texts contain the phrase (UDU.ME.GAL, so YOS 7, 193, 14) KAL-šū, which I do not understand.

- 111 Nbp. 19 was possibly a good year for Uruk herds, as far as can be seen from the few texts available: 1, 1; 1, 17; 0,84 and 1,45 lambs per ewe in four herds. GC II 2 (21.xii.Nbp.19) with 1,17 belongs to the next lambing season. YOS 7, 193 (12.iii.Camb.7) with at least 312 ewes and potentially 3 x 190 lambs would yield 1,82 lamb per ewe. As the numbers cannot be checked I

- would prefer to leave this text outside the discussion.
- 112 LB 1521 (22.iv.Nbp.7), LB 1537 (26.ii.Nbp.18) but cf. note 114, GC I, 2 (16.iv.Nbk.1), OECT 10, 107 (19.vii.Nbn.10).
- 113 ROMCT 2, 39 (23.iv.Nbk.28) has been included in the Uruk group on account of its use of *ka-lum* (and not *par-ri*). On the other hand it is one of those texts in which the number of goats is of greater importance than that of the sheep. That could locate the text in Sippar. With 0,35 lamb per ewe the yield is lower than all texts but one in Appendix III. Another possible Uruk text is F. Rochberg-Halton and P. Zimansky, JCS 31 (1979) p. 145 no. 20. ([?].iii.Nbk.[?]) With 580 ewes and 300 female lambs the "rule" that estimated yield is three times the number of female lambs results in 1,55 lamb per ewe. Durand EHE 474 and UCP 9/i no. 85 are probably transfers of animals, not inspections.
- 114 LB 1537 is probably no exception as the text includes 114 (unspecified) animals derived from the *irbu* of yr. 17. Only GC II, 3 produces an "average" result.
- 115 e.g. YOS 7, 39 (18.v.Cyr.4); 87 (Cyr. yr.?) cf. 83 (date lost).
- 116 cf. especially Kraus 1966, p. 26 note 1.
- 117 A rapid survey in Ryder 1983 yielded p. 199, 100:1; p. 216, 350:15; p. 218, 50 to 60:1 and 20 to 30:1; p. 219, 250:3 and 250:4; p. 236, (Iraq in general) 35:1; pp. 241–2, 5:1 (Basseri), p. 269, 30–50 (or aided 70):1; p. 275, 50:1. Kraus 1966 p. 27 note 2 (in the Odenwald) 50:1 in controlled circumstances, otherwise 80–100:1.
- 118 Cf. Kraus 1966, p. 140.
- 119 Cf. section VI, 4.
- 120 Cf. texts like YOS 6, 226 and AnOr 8, 65.
- 121 Cf. Landsberger MSL 8/i, pp.70ff. I must indicate that I am not completely convinced about the outright equation of GUD.NINDA₂ with a (castrated) ox, especially not as the earliest text in the series, Falkner AfO 16 (1952–53) Tf. XVI, BM 82–3–23, y (8.vii.Ššmk.0) lines 5 and 6 has a GUD *bi-i-ri* (damaged in both lines) combined with a *pargallu* for Bunene and Bêlet Sippar, which gods get in later, comparable texts a GUD.NINDA₂ (earliest text: Sollberger RA 74 (1980) p. 59). But this in turn exchanges with *tap<-ti-ru>* in other similar texts: CT 44,71 (20.xii.Nbk.1) line 8 etc. BRM 1, 91 listing *mār šatti* oxen which are either *šuklulu* or NINDA₂ is of course a strong argument for NINDA₂ meaning "castrated". But cf. also CT 55, 697 where 6 GUD *šuk-lu-lu* 4 GUD.NINDA₂ and [2] GUD *tap-ti-ri* add up to 12 GUD.MEŠ. MSL 8/i, p. 72, (but not AHw p. 1323 L) accepts one occurrence of UDU.NITA₂ *tap-ti-ri* "castrated sheep", but it should be noted that Nbk. 75:5 cannot be read unequivocally in this way as the two words UDU.NITA₂ and *tap-ti-ri* are the headings of two separate columns and the (damaged) text registers cattle in the summary. Line 1 possibly reads [UDU.NITA₂] *ù tap-ti-ri*. Note that texts about sacrifices from Sippar differentiate sheep according to age category, e.g. Sollberger RA 74 (1980) p. 59 *par-gal* and SILA₄.
- 122 Cf. note 20.
- 123 Cf. CT 33, 3, a Sippar letter, which mentions sheep sold for cash to traders (DAM.GAR.MEŠ) in the Opis area.
- 124 Except for the *hitpu*'s discussed CAD H p. 207R. YOS 7, 8 and Moore, Michigan 69 seem to associate this *hitpu* with the cattle and sheep departments of the *bīt urē*. Does this indicate a purification rather than a food offering? In YOS 7, 123 (25.viii.Camb.2) UDU.NITA₂ and SILA₄ are intended for *sattukku*'s, the MĀŠ.GAL and MĀŠ.TUR probably go to Abanu, if San Nicolò's suggestion is right, cf. AnOr 17/ii (1949) pp. 328–9.
- 125 cf. note 128.
- 126 Most of the not very informative evidence from Uruk relates to oxen, fowl or even equids. Cf. YOS 17, 13:18–19, but this is a specific occasion. Dubious: YOS 6, 299 (28.x.Nbn.11). This does not mean that the fattening of sheep did not occur in Uruk.
- 127 Nbn 357:10 (5.vii.Nbn.9) could suggest that 100 UDU.NITA₂ received 3 SILA₃ per day each, but the passage is damaged, and the reading of three instead of two SILA₃ is based on the shape of the sign only.
- 128 Whenever these lists indicate the origin of the sacrifices the *rē'û sattukki* is mentioned in Sippar: VS 6, 19 and 21, and he delivers sheep called *par-gal* and SILA₄. There is probably an important gap in our documentation regarding the fate of the sheep in the *bīt urē*. In Uruk the monthly lists

- registering expenditure and losses by both the *bīt urē* and the *rē'û sattukki* use a blank UDU.NITA₂.
- 129 Cf. McEwan, *Iraq* 45 (1983) pp. 187–198.
- 130 This is of some importance for the chances of retrieval during excavation: relatively young animals were cut up and shared out, which certainly reduced the chances that recognizable bones survive. Older animals and dead animals were disposed of in their entirety, which increases the chance that recognizable fragments remain. Perhaps this is the explanation of the fact that in many archaeological reports full-grown "caprovids" seem to predominate.
- 131 CAD S p. 316 L, AHw p. 1037 L. J. MacClellan (1983 pp. 300–307) discusses shears and their effect on the cutting of wool. A short pair of Parthian date from Nuzi has been published, but like that from Gordion, it is strictly speaking too late for our purposes. Even though the object is not actually present in Near Eastern archaeological contexts in the period dealt with here, the occurrence in Europe in La Tène contexts renders the interpretation "shears" possible, but not compelling. Shears could only be made from iron, which is the material consistently used for *sirpu*'s. A *sirpu* occurs in CT 55, 445:7 among the tools of a carpenter, and it is a household utensil in Nbn 258:15 and Camb 330:4. It could be used in jail breaking: YOS 7, 97:16.
- 132 M. de Jong-Ellis JCS 36 (1984) no. 15 (22.vi.Kand.11): 10 minas. Whether the temples consciously expanded their herds (cf. Appendix IV) in order to increase their income in wool can only be surmised for the moment.
- 133 R. Sack, ZA 77 (1987) p. 286, ([?].i.AwM.2).
- 134 Cf. GC I, 214 (2.ix.Nbk.39): 3 *ki-i pi-i* 4 MĀ.NA.AAN (for 1 š); GC I 389 (24.ii.Nbn.4); Sack JCS 24 p. 103: 14 (11.ix.Nbk.26), GC I, 192 (24.vi.Nbk.35), YOS 17, 339 (6.iv.Nbk.12): 12 mina of wool valued at 3 š for a bow; YOS 17, 352 (8.iii.Nbk.12) 4 mina of wool valued at 1 š for 0.0.5.0 of *sahle*. GC II, 30 (11.vii.Nbp.17) values 75 mina of wool at 30 š, i.e. 2,5 mina is 1 š and on the other hand in GC I, 95 (24.[?].Nbk.40[+x]) 6 mina equals 1 š. The value of 4 mina to a š is probably valid for standard quality raw wool, coloured wool is much more expensive, e.g. YOS 17, 210 and GC I, 382. This is understandable, as it had to be imported. The šG.MUG of GC I, 185 (19.i.Nbk.27) is of course at 30 mina for 3 š far below standard, as is to be expected.
- TCL 13, 224 illustrates the importance of both wool and cattle hides for the financial position of Eanna and probably also its standing business relations with certain dealers, in this case a Mandanu-šar-ušur. Lines 7–8 and 13–14 indicate a price of 5 mina of wool for 1 š, 9–10 gives fractionally less and 15–16 slightly more.
- The importance of wool as "capital" is also illustrated by YOS 6, 87 (28.xii.Nbn.7) 105 *biltu* of wool (à 4 mina per š valued at 26,25 mina) and 4 mina of silver are taken from Eanna. Cf. also the letter order GC I, 143 (undated) "Give 20 mina of wool as part of his silver to Balatsu". YOS 6, 61 (25.[?].Nbn.5) mentions wool as a part of the capital for a trading mission.
- 135 The SA, *gīdu*, plur. *gidāte* occur rarely: YOS 3, 122:21. Cf. CT 57, 171 (24.vi.Nbn.5) where one š of silver is provided for the buying of *gīdu*. No amount is stated.
- 136 *Iraq* 45 (1983) p. 197 and OECT I Pl. 20 lines 17, 24, 40, 41 and 47. YOS 6, 137 establishes the meaning sheepskin, cf. CT 55, 657 (9 and 10), *ša par-rat*, *ša par-ri*.
- 137 Cf. CT 56, 12 (19.i.Nbk.20) and CT 56, 18 (–) KUŠ *gi-il-lu*.
- 138 CT 56, 18; CT 56, 11; CT 56, 22. CT 56, 9: 1–4 is damaged.
- 139 Camb 7, 1 (7.viii.Camb.1): great and small.
- 140 Cf. the Sippar text Pinches, AJA 8 (1893) pp. 190–1 (8.x.Nbn.16). KUŠ.TAB.BA seems to be used exclusively for the hides of cattle, especially in Uruk, where it is weighed out, like *gildu* for *šindu* (YOS 17, 65). "Double hide" would be a suitable name for hides of cattle as they have double the thickness of that of sheep and goat. The skin of wool sheep also can be split, I am told.
- 141 YOS 17, 64 (5.v.Nbk.13) 21 ^{kuš}*duššu* ⁽²⁾*a-na za-ra-ti*, is to be combined with YOS 17, 103 and UCP 9/i no. 25. In Northwestern Europe leather tents of the Roman period were made from goat skin, with some additional use of calf skin. (Courtesy Dr. C. van Driel-Murray). Leather tents are not what one would expect in a Near Eastern climate, but cf. the ceremonial tent in the Topkapı Museum.
- 142 Line 9 uses the verb *ú-šá-az-za-zu-ú* "they must station them". The animals are not for slaughter.

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Appendix I Murašu and Aršam: private flocks

	BE 10,105	BE 10,106	UMBS 2,1,118		BE 10,132	BE 10,131	BE 10,130	UMBS 2,1,148	UMBS 2,1,147	UMBS 2,1,146	UMBS 2,1,145	UMBS 2,1,144	BE 9,1
Murašu				Aršam									
pu-ḫal	3	2	18	pu-ḫal	85	9	[34]	13	21	39	22	25	106
par-ri	11	4	3+	UDU-NITA ₂ MU 2-ú	36	27	36	27	23	36	36?	22	72
SILA ₄	12	8	14	UDU-NITA ₂ TUR.MU.AN.NA	58	37	64?	40?	42	?	63	34	152
U ₈ GAL-tú a-lit-tú	84	45	61+	U ₈ GAL-tú a-lit-tú	229	144	247	152	166	200	255	144	603
par-rat	27	15	9	UDU par-rat TUR.SAL.MU.AN.NA	58	38	64	40?	41	41	63	34	162?
total "white"	(137)	(74)	?	total "white"	466*	(255)	(445)	(272)	293	?	439	(259)	1095
MÁŠ.GAL	2	5	6	MÁŠ.GAL	0	25	4	1	7	21	[8?]	7	41
MÁŠ MU 2-ú	2	1	0?	MÁŠ (MU 2-ú)	0	9	3	1	2	9	3	4	19*
MÁŠ.TUR	5	[3]	1	MÁŠ.TUR	0	27	15	1	1	13	4	10	37
ÛZ GAL-tú a-lit-tú	15	20	[?]	ÛZ GAL-tú a-lit-tú	0	40	15	1	2	?	11	26	104
SAL.ÁŠ.GÀR	5	7	1?	SAL.ÁŠ.GÀR	0	17	6	0	1	13	4	8	37
total "black"	(29)	(35)	?	total "black"		(118)	(43)	(4)	(13)	?	(30)	(55)	238
total	166	109	141	total	466*	373	488	276	306	469	469*	314	1333

pu-bal Ug ka-lum par-rat TOTAL SHEEP MÁŠ.GAL Ûz MÁŠ.TUR SAL.ÁŠ.GÀR TOTAL GOATS TOTAL	10	105	18	167	24	86	[?]	8	6	0	10	13	1	37	33	14	18	[607]	25	Bassia s. Uzubat-ili	Gehken I 12	(10 + V Nbn? 17)
	109	926	216	1530	304	?	[?]	190	150	70	188	254	42	658	440	164	802*	312+	557	Nadinu s. Zababa-eres	YOS 7,193	12 III Camb 7
	10	100	21	250	[20]	?	[?]	23	14	5	10	22	7	65	93	31	12	20	48	Nabu-našir s. Laqipi	GC II 265	Cyr 7
	13	275	70	420	[24]	?	[?]	70	30	30	30	56	60	153	134	60	22*	190	161	Inanna-balassu-iqbi s. Inanna-zer-ibni	YOS 7,48	13 V Cyr 5
	142	1406	325	2567	372?	?	85	291	200	105	238	345	110	913	(700)	269	854	(562)	791	Inanna-lipi-usur s. Nabu-mušeitig-udda	Moore Mich. 41	11 IV Cyr 3
	36	2	10	16	4	?	10	1	2	0	41	3	0	3+	0	5	3	0	11	?	YOS 6,228	26 V Nbn 17
	144	6	75	21	21	?	86	33	20	10	200	12	1	?	0	35	11	41	20	Innin-lipi-usur s. Ardiya	YOS 6,128	16 IV Nbn 15
	30	[?]	0	7	5	?	46	11	5	0	33	2	0	?	?	8	5	6	6	Nanaš-iddina s. Arad-Inanna	GC I 400 (a)	14 III Nbn 13
	60	[?]	0	6	3	?	50	15	10	0	68	2	3	?	?	0	10	3	15	Adad-ušeizib s. Samiqi	YOS 6,227	22 [x] Nbn 10
	270	[?]	85	50	33	21	192	60	37	0	342	19	4	(637)	0	58	221	(62)	41	Nergal-našir s. Nanaš-iddina	OECT 10,107	19 VII Nbn 10
	412	[?]	1410	2617	405	?	274	351	237	115	580	364	114	1550	(700)	327	876	624?	832?	Nadinu s. Nanaš-eres	GC I 301	9 V Nbn 8
																				Arad-Inanna s. Marduk-eriba	TCL 12,83	25 VI Nbn 5
																				Nergal-šum-iddina	Florenz 150	13 III AwM 1
																				Balassu s. Nabu-ušalli	YOS 17,87	9 [x] Nbk [x] + 6
																					GC I 252	13 III Nbk 41
																				TCL 12,54	17 IV Nbk 36	
																				GC I 222	28 III Nbk 30	
																				ROMCT II 39	23 IV Nbk 28	

[illegible]

Appendix IV NBC 4897 R.H. Sack AOAT 203 p.117-8 with corrections based on copy by K.R. Nemet-Nejat. Flock of Nabû-aḥ ḫé-šullim s. Nabû-Šum-iškun 569-559 BC

	<flock>	KUŠ.ME	i-di	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi				
	Nbk II 36			Nbk II 37				Nbk II 38				Nbk II 39*				Nbk II 40*				Nbk II 41			
pu-ḫal	7	1	0	18	2	0		30	3	1		40	3	1		54	5	2		68	7	2	
U _g .ME	90	9*	3	101	10	3		119	12	3		138	14	4		158	16	5		182	18	5	1
ka-lum	12	0	0	16	0	0	2	18	0	0	2	23	0	0	2	27	0	0	6	31	0	0	1
par-rat	25*	2	1	36	3	2		40	4	2		45	4	3		53	5	3		60	6	3	
PAP BABBAR-ti	134*	12	4	171	15	5		207	19*	6*		246*	21	8		292	26	10		341	31	10	
MÁŠ.GAL	1	0	0	1	0	0		1	0	0		1	0	0		2	0	0	1	1	0	0	
ŪZ	2	0	0	3	0	0		5	0	0		5	0	0		6	0	0		8	1	1	
MÁŠ.TUR	0	0	0	0	0	0		1	0	0		1	0	0		1	[1?]	0		2	0	0	
SALÁŠ.QĀR	1	0	0	1	0	0		1	0	1		2	1	0		2	0	0		2	0	0	
Glg-ti	4	0	0	5	0	0		8	0	1		9	1	0		11	1	0		13	1	1	
PAP-ma	137	(12)	(4)	176	(15)	(5)		215	(19)	7		255*	22	(8)		303*	27	(10)		354	32	11	
wool	0			1.20½ MA (80.5 m.)				1.50 + MA (110+ m.)				2.24½ MA (144.5 m.)				2.45½ MA (165.5 m.)				4.8½ MA (248.5 m.)			
hair	0			0				0				0				0				0			

	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	ina ir-bi (XII yr 0)	BAR.GAL ina gi-iz-zi	<flock>	KUŠ.ME	i-di	<flock>	KUŠ.ME	i-di	BAR.GAL ina gi-iz-zi	<flock>	BAR.GAL (-)	am-ru	re-bi
	Nbk II 42				Nbk II 42				Nbk II 43				AW-M1				AW-M2				Ner 1					
89	8	3			89	8	3		111	10	4		131	5		131	13	4	170	16	6		209		5	193
209	21	6			209	21	6		237	23	7		275	68		343	34	11	390	39	11		453		138	315
40	0	0	7		40	0	0	7	41	0	0	7	48	8	5	56	0	0	66	0	0	5	80	8+3	14	66
65	6	4			65	6	4		80	8	4		90	20		110	11	7	133	13	7		146		41	105
403	35	13			403	35	13		469	41	15		544	101		640	58*	22	759*	68*	24		888		198	679
2	0	0			2	0	0		3	0	0		4	0		4	1	0	6	0	1		8		0	7
9	1	0			9	1	0		10	1	0		12	2		14	1	0	16	2	0		17		8	10
2	1	0			2	1	0		2	1	0		3	0		3	0	0	4	1	0		4		1	3
2	0	0			2	0	0		3	0	0		3	1		4	1	0	4	0	1		5		1	4?
15!	2	0			15!	2	0		18	2	0		22	3!		25!	3	0	30	3	2		34		10	24
418	37	(13)			418	37	(13)		487!	43	(15)		566	104		665	61	(22)	789	71	26		922		208	703
5½ 9½ MA (339½ m.)				5½ 9½ MA (339½ m.)				7.1½ MA (421.5 m.)				8.34½ MA (523.5 m.)				11.22.5 MA (682.4 m.)				17.5 MA (1025 m.)						
0				0				0				8 5/6 MA				20 5/6 MA				[10 MA?]						
												Total Nbk II yr 37 - Ner yr. 1				wool 58.36.5 MA*				hair 40 5/6 MA (?)						